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Eight research projects conducted by different investigators on research and development activities in vocational and technical education for non-metropolitan areas are reported. Report titles are: (1) The Decision Making Process of School Districts Regarding Vocational Education and Training Programs, (2) Occupational Problems and Vocational Training Needs of High School Dropouts From Rural Areas om Iowa, (3) Inter-relationship of Home Environment and Employment, (4) Manpower Requirements and Demand in Agriculture by Regions and Nationally, With Estimation of Vocational Training and Educational Needs and Productivity, (5) Predicting Change in Technology Jobs and Vocational Training Needs in Rural Labor Markets, (6) The Potential Contribution of Psychology to Inter-disciplinary Research in Vocational and Technical Education, (7) Determinants of the Post High School Educational and Occupational Choices of Iowa Farm Boys, and (8) An Analysis of Legal and Political Problems and the Strategy Necessary for Implementing Programs Under the Vocational Education Act of 1963. This report is an appendix to VT 007 214. Related documents are available as ED 011 068, ED 011 069 and VT 007128-VT 007 130. (DM)

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APPENDIX ONE

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RESEARCH AND DEVELOPMENT IN VOCATIONAL AND TECHNICAL EDUCATION: NON-METROPOLITAN AREAS; RESEARCH REPORTS
APPENDIX ONE

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Ames, Iowa

June 1968

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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PREFACE

This appendix consists of eight research reports submitted by principal investigators who performed the research between July, 1965 & November, 1966. These activities represent one major contribution under contract O.E. 5-85-108, a project for research and development in vocational and technical education for non-metropolitan areas.

THE DECISION-MAKING PROCESS OF SCHOOL DISTRICTS REGARDING VOCATIONAL EDUCATION AND TRAINING PROGRAMS

Project No. 1
Contract No. O. E. 5-85-108

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November 1966

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The superintendents who provided the data related to their district bond election are also gratefully acknowledged.

THE DECISION-MAKING PROCESS OF SCHOOL DISTRICTS REGARDING VOCATIONAL EDUCATION AND TRAINING PROGRAMS

I. Introduction

One kind of social change can be considered purposive or instigated social change. This report centers on school board attempts to change educational facilities by financing through school bond elections. This kind of community decision-making is differentiated from another kind usually made by elected officials. Many decisions that have consequences for the school district are made by school boards, superintendents, administrators in state education departments and legislators. However, the decisions discussed herein require the involvement of the district electorate to change the school system and facilities.

The accepted method for a school district to obtain funds for large capital outlays is through a school bond proposal voted upon by the district electorate. This method is said to be inefficient and obsolete by some.(18) The increasing number of elections, however, indicates that bond elections are still the major means to secure funds for large capital outlays. Despite the recognized fact that many public school facilities are chronically inadequate, school officials often face a struggle in securing a definition of need for additional facilities and further in securing a favorable action (passage of a bond proposal). Even so, the electorate holds a generalized feeling that education is necessary and that the "democratic process" (election) is the best way to resolve issues. Usually, issues are resolved on specifics, and objections take the form of opposition to the selected site, an increase in taxes, dissatisfaction with proposed plans, etc. Ordinarily, there is no organized opposition to the generalized need for educational facilities, although exceptions can be found.

A. The Problem

This research project was initiated to examine the nature and scope of school bond elections requesting funds for vocational and technical education purposes. A literature survey revealed that little is known about school bond elections in general and even less about bond elections for vocational purposes.

Further, most of the data available are impressionistic or descriptive reports of a single bond campaign in a specific community. It is very difficult to generalize from one community to another because of: different requirements for passing the issue (50% to 66.6%), different bases from which the relative need had been assessed, different strategies used, and lack of conceptual clarity and precise measurement. These difficulties are discussed in the review of literature section of this report.

From the beginning of this research the authors have believed that the process of proposing and implementing school bond issues is a complex, temporal process involving many different actions and consulting actors and groups, many different techniques and strategies, and many different specific target audiences.

We thought that detailed reconstruction of the complex actions and processes of recently attempted bond issues or studying ongoing campaigns would be more ideal than post-factum data collected from one or two individuals. Also, precise theoretical orientations, concepts and qualitative and quantitative measurement were needed for significant understanding and prediction. However, consistent with the resources available and one element of a research philosophy, the decision was made to carry out an exploratory study within a generalized conceptual frame to attempt to determine the magnitude and dimensions of the problem. This approach is consistent with that suggested by Robert Merton. In the introduction to Sociology Today, Merton suggested that a relatively simple descriptive framework may be sufficient for collecting and analyzing data in a new area of sociological study.(13)

The research reported here is an exploratory attempt to establish and quantify the problem and to provide a basis for more rigorous conceptualization and methods for later studies. The total Iowa school-district population was examined to determine how many and which districts had engaged in bond issues to improve or increase their present vocational education programs and facilities. The population studied in this first phase was all Iowa School districts involved in school bond issues (for the addition of facilities for any purpose) over 5 years

(January 1, 1960, to December 31, 1964).* The second phase involved intensive interviews with superintendents in those districts involved in school-bond issues in which vocational education was a part of the issue.

B. Review of Related Research

The struggle to obtain educational funds through bond issues is evident in the amount of descriptive literature available. Most discussions are found in professional education journals and magazines with teacher and school-administrator audiences. These articles present lists, in many cases conflicting, of recommended techniques for school bond elections. The general theme in many of these articles is the use of communication techniques to inform and involve as many people as possible and to stimulate a large turnout at election time. There is no agreement, however, on which or how many communication techniques should be used. Some educators state that a well-informed electorate will recognize their duty and pass the bond issue. Others are equally sure that, the less knowledge the electorate has and the higher the level of generalization of information, the more likely it is that the issue will pass.

The desire of school administrators to increase voter turnout seems to conflict with much evidence indicating that voter turnout is negatively correlated with a favorable vote.(5) Stone, however, feels that an extensive publicity campaign can offset the negative influence of high voter turnout.(19) At a generalized level, school administrators and board members feel that involving as many individuals in as many ways as possible will result in passage of the issue. This feeling is often expressed by educators as "talking it up" by community members.

Both education journals and educational-administration texts stress involving as many people as possible, generally with the use of "citizens' advisory committees." The recommended composition of this committee may vary from representatives of the community (representative carries a variety of interpretations) to the most "talented" community members. Educators generally stress the ideal of democracy and democratic procedures.

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*The findings from this phase are summarized in the results section of this report and are presented in detail in (1).

Any influence exerted by an informal power structure is suspected of being for selfish interests and, therefore, denounced by most. (4, 6, 11, 12) Kimbrough presents another viewpoint and urges educators to make themselves aware of their informal community power structure(s) and to use it to legitimize school bond elections.(10) However, many studies indicate that educators do not recognize district education power structures. Also, it appears that educators who do recognize the existence of power structure do not desire to use it and are unable to interact at this status level, or tend to avoid involvement with these community influentials.

A few studies backed by empirical research have been completed. These researchers have examined the relationship of variables such as size of school, school district population, size of bond issue and assessed valuation (total and per pupil) to passage of the bond issue. Few of these variables have been related to passage of bond issues.(3,8,9,16,) One researcher, Smith,(18) studied voter characteristics rather than the school district, in the Los Angeles City School District. His findings indicate demographic characteristics should play a part in selecting both media and message content. He suggests those census tracts containing mainly young working class families with school-age children should be "courted" with public relations campaigns and favorable newspaper publicity. Smith supports giving specific information to the voters, whereas others have suggested general descriptive terms will produce the most favorable results.

In summary, one can become quite confused in examining the available literature on strategy to successfully culminate a school-bond issue campaign. Many of the studies just mentioned consist of impressionistic descriptive accounts of successful techniques for a specific campaign. Many of these authors, however, are quite willing to generalize to other districts and other elections by presenting lists of techniques to be employed by other school administrators and school boards. Little information about elections for vocationally related purposes is available, and many of the articles presented preceded the current emphasis on vocational and technical education. Also, many states are considering and implementing area vocational schools. In several cases, these are administrative decisions that do not require voter approval, and often these facilities are for post-high school training. The focus of the research in this report is on high school vocational facilities.(1)

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[1] For an extensive review of the literature relating to school bond issues, see (1).

C. Objectives

The literature review disclosed several generalizations from the descriptive articles that were locality bound to the community where the observations were made. Contradictory evidence also was presented and a clear picture of the social process involved in school-bond-election strategy is not discernible from the existing data. As a result, it was judged necessary to attempt to extablish the dimensions of this kind of social action in Iowa. More specifically, the objectives of this study were:

1. To analyze the decision-making process of school districts regarding vocational education and training programs.

2. To determine crucial variables related to the "success-failure" continuum of proposed vocational education and training programs of school districts.

3. To make recommendations on the social action strategies to secure positive decisions by school districts on recommended vocational education and training programs.

To attain these objectives, a two stage research design was implemented.

II. METHOD

The names of the school districts in Iowa involved in school bond elections were obtained principally from secondary sources. Agencies providing this information were:

1) Research Center for School Administration, University of Iowa.

2) Iowa State Department of Public Instruction.

3) Iowa Association of School Boards.

In addition, information forms were mailed to all county superintendents and high school principals. A list was then compiled which showed that 209 districts had held 364 elections on 241 different bond proposals from January 1, 1960, to December 31, 1964. Additional restrictions were that the district must have maintained a public high school, junior high school or a community college, and the bond proposal had to be presented for educational or related purposes. The population included all Iowa school districts that had held school bond elections during the 5-year period and met these criteria.

A questionnaire was constructed and mailed to the superintendent of each school district that had held an election. A total of 195, or 93 percent, of the 209 school superintendents responded.

The data reported here represent the superintendents' perceptions following the elections. No attempt has been made to evaluate these perceptions with other observers, nor have the researchers evaluated the perceptions as accurate or inaccurate. They are presented only as perceptions.

These data were coded and analyzed for an interim report (1) and two articles (2,7). The interim report presented frequency distributions for each variable for all districts and for the successful and unsuccessful districts; the chi-square statistic was used for the data presented. In additon, the variables that could be quantified were used in a correlation matrix, resulting in a 38-variable matrix, which served as the basis for the two articles. One article examined correlations with the voter turnout as the dependent variable, and the second focused on percentage affirmative vote as the dependent variable. These results are presented in the results section of this report.

The study involving all Iowa school districts that had held school-bond elections produced names of districts that had sought funds through bond issues for vocational and technical education purposes. Twenty-four districts had included vocational facilities in the stated purpose of the school-bond issue; however, none of the elections was for vocational facilities alone. This established the number of districts in the universe for the second phase of the project involving vocational education and training.

A questionnaire was developed to provide data to more precisely analyze the voactional-education portion of the bond election. Specific sections of the questionnaire were designed to supply information about the following areas:

1) additional district characteristics (industry, proximity to an urban center, etc),

2) demographic information about the community (size, percentages of students migrating, going on to college, dropout ratios, etc.),

3) community attitudes toward education in general and to their school in specific,

4) characteristics of the vocational-education program of the district, and

5) superintendent attitudes toward the development of area vocational schools.

These data were collected by personal interviews with the school superintendents and represent each superintendent's perceptions of the community and its attitudes. No attempt was made at this time to obtain perceptions of other individuals regarding these same phenomena. The information obtained allowed a closer analysis of:

1) the perceived importance of the vocational-education portion of the total bond election campaign.

2) the knowledge levels and attitudes toward the recently organized "area vocational schools," and

3) whether changes had occurred in vocational education offerings.

Since the sample was small (24 possible respondents) and approximates a universe, no attempt was made to statistically analyze the results. Ultimately, 20 of the 24 superintendents were interviewed. Hence, the findings of the vocational school bond-issue portion of the project are principally descriptive.

This discussion has focused mainly on describing and quantifying many dimensions of school bond issues and bond issue techniques. In addition, selected variables have been analyzed, within a pass-fail dichotomy framework, for significant differences. The final analysis of the data centered on predicting the outcome of school-bond elections. Multiple regression equations were built from selected variables. The results of selected variables and their predictive ability are presented in the results section.

III. RESULTS

A. Basic Study of 195 Bond Issues

The results obtained in this study are presented in a manner commensurate with the various stages of the project development: (a) the results form the origial survey of 195 districts, (b) the results of the analysis of percentage of affirmative vote as a dependent variable, (c) the results of the analysis on voter turnout, (d) the results of the intensive interviews of the vocational education superintendents, and (e) the results of the multiple regression analysis.

The basic study consisted of 195 Iowa school-bond elections. One hundred fifty-four (79%) of the districts had successfully passed bond election during the 5-year period. The data collected in these districts were analyzed by examining the distribution of approximately 250 variables for all districts. The total districts were then divided into a pass-fail dichotomy (154-41) for a statistical examination (chi-square) of possible significant differences between groups. This analysis is presented by variable categories; i.e., existing situational variables, the characeristics of the bond elections, the strategy employed in the election, responsibility assumed for various tasks in the election strategy and the timing and communications techniques used in the election campaign.

1. Existing situational variables. These variables were defined as the characteristics of the school and community that existed before the bond election. These factors could not be changed or manipulated; however, they may influence bond-issue strategy and results. Economic variables, tax rates, proposed rate changes, district population and enrollment figures were all considered in the plan to increase school facilities through a school-bond election. Only three of the 12 variables included in this category produced chi-squares significant at the 5-percent level. School enrollment at the time of the election was significantly different between the successful and unsuccessful districts. Those schools with enrollments under 1,000 had a higher rate of successful bond issues than did schools with enrollments between

1,000 and 2,000. There was a tendency for schools with an enrollment of over 3,000 also to be successful.

The significant difference between those districts with and without a 2 1/2-mill schoolhouse tax levy before the bond issue may be indicative of a norm of "progressiveness" in the community. Of the 35 districts where this levy was in effect, 32 passed their bond election.

The chi-square computed on the number of elections held in the 5 years was highly significant. Districts were much more likely to pass their bond issue if it was their first attempt during the period. Almost two-thirds of the districts studied had held only one bond election during this time. Approximately 70 percent of these elections were successful.

2. Characteristics of the bond issue. Economic change, purpose of the election and responsibility assumed by various groups and individuals in accomplishing the necessary tasks in the campaign strategy were classified as characteristics of the bond issue strategy.

Economic relationships did not differ significantly between successful and unsuccessful districts. The total amount of the bond issue, existing millage rates, millage increases and the dollar valuation per student were not statistically different when successful and unsuccessful issues were compared.

Neither the terms of statement of the issue (general of specific) nor variables relating to the purpose of the election were significant. The literature survey indicated some support for making detailed information available to the electorate and for presenting the issues at a general level. Neither position was supported in this study. The intended purposes for the bond issue money were not related to outcome, nor was the number of different purposes stated significantly different between the successful and unsuccessful districts.

3. Election strategy. These variables dealt with individual and group involvement in working in the campaign. The superintendents evaluated the perceived importance of themselves, the board of education, the lay committee (if present), the architect, the department of education consultants, the Parent-Teachers Association (P.T.A.) (if present) and the faculty in performing

services in seven necessary tasks. Some tasks required joint participation between the superintendent and the board of education. When this joint evaluation is discussed, the term, superintendent-board of education, will be used.

Only two of the 13 variables in this category had significant chi-square statistics. One was the perceived importance of the citizens' advisory committee in the planning and publicity of bond campaigns. The distribution was bi-modal for the successful districts, with a large percentage (43.5%) seeing this committee as having "no value" and a similar percentage (38%) seeing the committee as having "great value" to the planning and publicity campaign.

The second significant relationship was perceived "value" of the P.T.A. in the bond-issue campaign, which was statistically significant between successful and unsuccessful elections. The superintendents in districts that had successful elections rated the P.T.A. somewhat higher (of greater value) than did superintendents in unsuccessful districts. The unsuccessful superintendents' responses clustered in the middle range ("some" or "little" value) for P.T.A. importance.

4. Responsibility assumed by groups. This section considers to what degree various individuals and groups were involved in the task areas. Again, these responses were the evaluation of the superintendent. Some of the tasks necessary in a bond campaign include: (a) the evaluation of the present education program, (b) an evaluation of the existing building facilities, (c) determination of the school building needs, (d) designing and planning proposed buildings, (e) planning the finance program, (f) public relations and information, and (g) planning the campaign strategy. The superintendents rated the importance of the groups on a 0-9 scale, with categories from "no", responsibility (0 score) to "very much" responsibility, (9 score).

Of the 69 variables analyzed, only eight show significant differences between successful and unsuccessful bond elections. The superintendents differed in their perceptions of the board of education's and their own importance in the campaign strategy. Eighty-one percent of the successful superintendents rated themselves as having assumed "very much" responsibility in the public relations and information campaign and, conversely, just over half (54%) of the unsuccessful superintendents rated themselves this high. There was no significant difference between the superintendents' perceptions of the importance of the various other groups in planning the campaign strategy.

Two significant relationships were found in the "evaluation of the ecducation program" for the bond election. The professional consultants were rated as assuming "little" or "no" responsibility by a larger percentage of the successful superintendents (66% successful to 56% unsuccessful). At the other extreme, "very much" responsibility, the successful superintendents also rated the professional consultants high in more cases (6.5% to 2.4%). A similar pattern of findings occurred in the ratings of the department of public instruction in evaluating the educational program. More (56% to 46%) of the successful superintendents rated the department as assuming "little or no" responsibility in this evaluation. Conversely, more successful than unsuccessful superintendents also rated this department as having assumed "very much" responsibility (8% - 0).

"Evaluating the present building facilities" by the various groups produced only one significant chi-square (responsiblity assumed by the lay committee). A bi-modal array appears in the successful districts. More of the successful than unsuccessful superintendents reported "little or no" responsibility and "very much" responsibility assumed by the lay committee. Unsuccessful superintendents did not evaluate the responsibility of the lay committee in this evaluation at the scale extremes, but assigned them to mid-scale positions ("some - much").

The involvement of the lay committee also produced the only significant difference in the "determination of the school building needs." The board and the superintendents assumed heavy responsibility in this task, but there was no statistically significant difference between the successful and the unsuccessful districts. Sixty-one percent of the unsuccessful districts reported some involvement of the lay committee in this task. Conversely, only 43 percent of the successful superintendents reported lay committee involvement in determining school building needs.

A significant difference between the successful and the unsuccessful superintendents' evaluations was found in the responsibility assumed by the superintendent-board of education in designing and planning the proposed buildings. The superintendent-board of education responsibility, however, was not the highest ranking of the groups. On the other hand, the architect involvement was high for this task, but did not produce a significant difference between successful and unsuccessful districts.

The responsibility assumed by the professional consultants for planning the financing program for the bond election produced a significant chi-square. The superintendents in unsuccessful districts evaluated outside consultants as assuming more responsibility than those in successful districts. This higher evaluation accounted for the significant difference in the chi-square.

5. Collective responsibility for all tasks. The combined possible points for each task area was 63, (7 x high value of 0 - 9 continuum). The actual range for combined tasks was 0 - 63. Some superintendents reported "no responsibility" in any task area (0 score), while others assigned themselves to the highest score (9) for all seven tasks (63 score). The summated scores represent the relative importance of assumed responsibility for each individual or group across all seven task areas.

The total responsibility assumed by the superintendent-board of education together was significant at the 5-percent level. The superintendents in successful districts had higher responsibility scores than those in unsuccessful districts. This was the only significant chi-square for the five groups presented in the section on summated responsibility scores.

An examination of the relative importance of the groups and individuals involved in the school-bond elections showed that the superintendent and the board of education positions were rated most important. The ratings of positions were similar in the successful and unsuccessful districts. Hence, the chi-square statistics indicate there was little difference in these perceptions between the successful and unsuccessful district superintendents.

In summary, the superintendents clearly perceived cooperative performance between the superintendents and the board of education as the most important of the five groups in responsibility and importance in the bond elections in all (or across) task areas. The literature survey indicated that the use of a citizens' advisory committee was essential in passing the bond election. The data collected in this report do not support this position; however, insights into whether the support of a lay committee provides the added impetus for success are not possible.

6. Election timing. The time of the year (month) elections are held was not related to successful or unsuccessful bond elections in this study; however, the timing of news releases was associated

with election success. Those districts that started early (more than 6 months before election) were most successful. This finding should not be misconstrued, however, because almost three-fourths of the districts made their first releases less than 6 months before the election. Of the 47 districts that started more than 6 months before the election, 43 passed their elections. That most districts did not start their campaigns early, in part, reflects the persistence of re-presenting elections within a short time in unsuccessful districts. Some were re-presented in the same month, and many were re-presented within 2 months. There was no significant difference between successful and unsuccessful districts in how long between elections or how many months early official notice of election was given.

7. Communications strategy. The communications techniques used are a manifestation of planning strategy. Data were obtained on whether the following techniques were used and how important they were in the campaign.

Bulletins and brochures
Speakers at clubs and organizations
Proposed building plans illustrated
General talking up of issue by people
General public meetings
Poster campaign
Student presentations
Local merchant support in ads
Clergy support in churches
Newspaper publicity
Radio and TV publicity
Sample ballots and voting information
Picture depiction of present conditions

Most of the districts used these techniques, and there were some significant differences between successful and unsuccessful districts on the basis of communications techniques used. A significantly larger portion of the successful superintendents reported "favorable" newspaper coverage: Seventy-seven percent of the superintendents in successful districts responded that newspaper coverage had been favorable, but only 56 percent of the unsuccessful superintendents reported favorable coverage. There was no significant difference in the number of press releases.

The perceived importance of newspaper publicity was significant at the 1-percent level. Seventy-one percent of the superintendents of successful districts felt the newspaper was of "much" or "very much" value. Conversely, only 44 percent of the superintendents of unsuccessful districts rated the newspaper as important.

The chi-square statistic for use of letters to the editor as a campaign strategy was significant at the 1-percent level. Fifty-nine percent of the unsuccessful superintendents reported the use of this technique. Less than 30 percent of the successful superintendents responded that this technique was used. Where letters to the editor were used, there was a significant difference in the perceived value of this technique. Twenty-one percent of the superintendents of successful districts responded that it was of "some" value, and 44 percent of the unsuccessful superintendents responded with "some" value. The remainder in both groups said the technique was of no "value" in producing campaign success. The chi-square between groups was significant at the 5-percent level.

8. Interpersonal communications techniques. These techniques were those that involved face-to-face relationships, such as meetings, student presentations and house-to-house canvasses. Only the very nebulous technique "talking it up," and public meetings produced significant chi-squares. Eighteen percent of the successful superintendents thought the meetings were of "very much" value. Only 2 percent of the unsuccessful superintendents rated public meetings in this classification. The remainder of the interpersonal techniques were used in most campaigns; however, there was no statistically significant difference in their use.

9. Other publicity devices. These devices include miscellaneous techniques used for informing the electorate and getting out the vote. The perceived value of presenting illustrated building plans to the electorate was significant at the 5-percent level. The successful superintendents rated this technique somewhat higher than it was rated by the unsuccessful superintendents. In addition, successful superintendents evaluated the use of photographs to show existing conditions higher than did unsuccessful superintendents. None of the successful superintendents evaluated this technique as "very" important; 12 percent of the successful superintendents did. The difference was significant at the 5 percent level.

One method traditionally used to "get out the vote," transportation to the polls, produced a significant chi-square. This method was much more common in the unsuccessful districts.

In summary, most communications media and techniques were used by all districts, but few significant differences were found between the successful and the unsuccessful districts. The successful superintendents did evaluate favorable newspaper publicity higher than did unsuccessful superintendents. Some techniques (letters to the editor and providing transportation to the polls) that were expected to produce favorable results were associated with the unsuccessful districts. The data, however, do not permit explanations.

10. Perceived reasons for passage. The superintendents of successful districts were asked to rate the relative importance of the following reasons for passage:

Need for facility proposed
Good publicity program
Timing of election
Adequate support of education
School reorganization
Desire to keep school in community
Development of new educational program
Compromise or reduction of actual needs
Terms of statement of issue

Since these responses are all from superintendents whose districts had successfully completed bond elections, no statistics were computed on these reasons for passage. In general, these ratings indicated the superintendents were able to evaluate the importance of the factors that they felt were instrumental in bringing about the successful outcome of the election. The nebulous "need" was rated the most important factor in bringing about success. Other factors such as timing, reorganization, desire to maintain the school in the community, a "good" publicity campaign and the terms of statement of the issue were not seen as nearly as important factors. In addition, the superintendents were given the opportunity to add any other factors that they felt were important in the outcome of their campaign. Only three superintendents mentioned other reasons.

11. Perceived reasons for failure. The superintendents of unsuccessful districts were asked to rate the relative importance of the following reasons for election failure.

Increased taxes
Distribution of tax load
Site dispute
Inadequate publicity
Disagreement on type of construction
Dissatisfaction with educational program
Conflict among civic groups
Elections too close together
Insufficient planning
Opposition from retired
Opposition from absentee landlord
Proposed bond issue too large
Proposed bond issue too small
Too many types of facilities proposed in one election
Dissatisfaction with board of education
Dissatisfaction with superintendent

The superintendents of unsuccessful districts were not as certain about why the issues failed as the successful superintendents were about why the issues passed. Most of the reasons given as influential were related to economic variables; i.e., increased taxes, distribution of tax load and opposition from the retired. When the economic situational variables were examined by chi-square statistics for differences between the successful and unsuccessful districts, no significant differences were found between these districts. The traditional reasons for failure, often suggested in the literature, such as site disputes, type of construction and community conflicts were not mentioned as important factors by many superintendents. Four superintendents mentioned specific conflicts between committees, adjoining towns and within the district. Others mentioned factors such as no attempt was made to pass the issue and the proposal was a "stop-gap" measure.

B. Voter Turnout Analysis

All statistics presented in the preceding findings have been the results of the chi-square statistics prepared for the interim report. The next two sections center on the same data with more robust statistical methods used. In this section, voter turnout (dependent variable) has been correlated with 38 independent variables.

The data analyzed in this section made it possible to examine whether voter turnout was related to issue outcome and to see if techniques tradionally used to get out the vote were operative in these Iowa school-bond elections. There was no relationship between passage and the percentage of the eligible voters voting in this study. The correlation was +.0029 which is about as near random variance as one can obtain.

The 38-variable correlation matrix presented earlier in this report provided the basis for generalizations presented in this section. There were some significant correlations with voter turnout (9 of 38 examined). Most of the significant correlations were with economic and voting history characteristics of the districts. Only three of the variables labeled "communications" and "supportive services to get out the vote" were significantly associated with voter turnout.

These data were contrary to suggestions that voter turnout is associated with outcome of the issue. The percentage of the registered voters turning out in these Iowa elections was not significantly associated with the size of the issue, with the percentage voting in favor of the issue, or with whether the issue passed or failed. It appears that community interests in the economic aspects of these elections is operative because of significant relationships between voter turnout and the millage increase (resulting from the bond issue) and with the total millage rate for the community. In this examination, the traditional suggestions for attempting to restrict or increase the voter turnout did not hold. The mass-media techniques traditionally used to induce voter turnout were not significantly associated with voter turnout. When significant relationships were found, they were negative associations.

Major findings of this further analysis indicate:

1) The percentage of registered voters participating in these elections was not significantly correlated with whether the issue passed or failed.

2) Communications techniques and devices used to get out the vote were generally not significantly correlated with voter turnout.

3) Economic variables dealing with millage increase and total millage levy appear more important than the total amount of the issue in increasing voter turnout.

4) Apparently, "norms" toward progressiveness (passing school bond issues) exist in some communities.

C. Percentage Affirmative Vote Analysis

The single variable relationships of association between demographic, economic, election history and communications techniques were examined in this analysis. The same 38-variable matrix provided the correlations for this examination with percentage affirmative vote as the dependent variable. Since pass-fail is a dichotomy, the continuous variable, percentage affirmative vote, was used as the dependent variable.

The major findings of this analysis indicate there was little relationship between election outcome and the traditional campaign techniques reported as essential in securing school-bond passage. More specifically:

1) There was no significant association between the demographic characteristics of the district and favorable vote.

2) There was little association between the economic variables and percentage favorable vote. (amount of issue, millage increase, etc.)

3) There was a tendency for more favorable voting percentages to be associated with fewer elections. No attempt was made to relate this to relative "need" in the district.

4) Communication variables and secondary service techniques had little relation to percentage favorable vote in the district. Any significant relationship was likely to be negative.

5) The percentage of the registered voters participating in these elections was not significantly correlated with the outcome of the issue.

D. Additional Correlation Analysis

The 195 districts were divided into two groups for further correlation analysis. This resulted in 154 successful districts on one group and 41 unsuccessful districts in the other. The correlations resulting from these additional matrices were quite similar to the overall (195 districts) matrix.

Analysis of variance tests also were run on selected variables to test for significant differences between the successful and unsuccessful districts. The lack of significant f ratios led to the conclusion that successful and unsuccessful districts were not significantly different with respect to the variables examined.

To further test for the possibility that district size and dollar amounts of askings were influencing the analysis, ratios were computed by using selected economic variables. This also produced standardized scores. Ratios were computed for:

1) $\frac{\text{amount of issue}}{\text{valuation per student}}$

2) $\frac{\text{amount of issue}}{\text{total school millage levy}}$

3) $\frac{\text{amount of issue}}{\text{total school enrollment}}$

4) $\frac{\text{amount of issue}}{\text{population of the school district}}$

There seemed to be no significant differences when successful and unsuccessful elections were compared by using these ratios. For example, some districts with high total school millage - amount of issue ratios - passed and some failed. These ratios did not disclose any additional information not contained in the correlations between the economic variables and percentage affirmative vote, but they gave weight to the assumption that the correlations did not result from overweighting of large economically strong districts.

E. Vocational Education Bond Elections

The field study of what influence the vocational portion of the bond election played in the outcome did not produce many significant findings. None of these elections was held for vocational purposes alone, and a correlation matrix using vocational education "purposes" as a control variable did not produce significant differences between the elections including vocational purposes and those for other purposes. That is, elections including vocational purposes were compared with all other districts on demographic, economic, election history and communication characteristics. No significant differences were found; however, the original survey (195 districts) was not designed to elicit detailed factors associated with the vocational portion of bond elections.

This section reports results from the personal interviews centering on the vocational-education portion of the bond campaign. Because of the small number of cases (20 of 24 possible) no statistical analyses are presented in this section. There was a lapse of at least 2 years between the bond election and the time of this study. Therefore, the impact of the changes created by the outcome of the bond election plus the initial impact of the 1963 Vocational, Education Act could be viewed, making possible a deeper analysis of the influence of the Act.

Funds were sought for increasing present course offerings, development of new courses, new shop facilities and, in one case, for a new bus barn. The vocational portion of the bond issue ranged from a low of about 5 percent to a high of about 40 percent of the total bond election. Fifteen of the issues passed and 5 of these elections failed to obtain the necessary 60 percent affirmative vote needed to pass.

In general, the districts had maintained their size since the earlier survey through school year 1963 - 1964. The reported information displayed trends similar to those for the remainder of the districts in the state. The superintendents reported that about 45 percent of their students went on for some kind of additional training; i.e., 4 year, junior, trade school, etc. Most superintendents were aware of the high rate of out-migration of their students. Forty percent of the superintendents estimated there were less than one-fifth of the high school graduates remaining in the community 10 years after graduation. In all cases out-migration was reported to take place immediately after high school, when the young people either sought employment or further education outside the community.

None of the 20 superintendents felt that their drop-out rate was "above" average, and 70 percent of the superintendents reported that it was so low that the community was not concerned about it. Half of the superintendents said that additional vocational facilities would not affect the drop-out rate, saying "They would have dropped out anyway." Some evidence of concern was noted for adjusting curriculum to fit the non-college bound. One superintendent perceived that community awareness of the need for a broadened curriculum was the reason the successful bond issue passed in his district. In general, however, the superintendents did not perceive a community concern or awareness of the need for increased programs for the non-college bound. The superintendents expressed the view that increased vocational facilities would not detract from present course offerings, but would supplement the college preparatory curriculum by reading a different segment of the student body.

All superintendents in districts in which the bond issues were passed stated that the vocational education portion of the bond issue had produced favorable results. A third of all district superintendents said they had increased vocational offerings, and 50 percent said they had strengthened their offerings since the successful vote. Fifteen percent said they reduced their vocational offerings (all were in districts where the issue failed.) Some facilities had been added in two of the districts that failed to pass their bond issues.

F. Importance of Vocational Education

The influence of the vocational-education portion of the bond issue was not too great. One of the most significant findings of this study was that the superintendents evidently do not separate the vocational portion of their curriculum from the total program. When asked to discuss the vocational portion of the issue, they responded with what was requested in terms of facilities and money, but they were generally not able to discern what (if any) influence the vocational portion of the issue had on the outcome. Only two superintendents said that the vocational portion had "considerable" influence, 10 percent said "some," 35 percent said "little" influence, and 45 percent said "very little" influence on election outcome.

The general consensus of the superintendents was that neither they nor the voters separated the vocational-education portion of the bond issue from the total issue in their thinking. The superintendents thought that the deletion of the vocational portion would not have changed the outcome very much.

The vocational-education programs of the districts were perceived by the superintendents as being differentially viewed by the superintendents and the electorate of their districts. Sixty percent of the voters were perceived as thinking that vocational education accelerated out-migration. The superintendents, on the other hand, did not feel that the programs had this much influence because 25 percent of the superintendents replied that vocational education did accelerate out-migration, 35 percent that it did not make any difference, and the remainder, (40%) that it did not cause migration.

The purpose of vocational education was not perceived as being attuned to the local labor market conditions. Both the voters and the superintendents were perceived as viewing this training as preparation to compete in the larger labor market, generally away from the community in which they had been educated.

Attitudes toward area vocational schools were generally favorable; 90 percent of the superintendents favored this new program. There was a lack of knowledge about the role to be played by these new area vocational schools. The generally favorable attitude toward the area school concept was not backed by similar expectations of how these schools would affect the vocational-educational facilities presently offered in their schools. Some superintendents felt these new area schools would relieve the high schools of their vocational education responsibilities but there also were expressions of concern about promoting an increase in the high school drop-out rates to attend these schools, students not being able to afford to attend the area schools and students having to travel too far to attend these schools. Some superintendents did not understand that these schools were intended to be principally post-high school programs. This lack of knowledge was manifested in the responses to what effect the area school would have on the vocational education program of their school. Ten percent said the area school would have no effect on their program, 35 percent thought it would have "little" effect, 15 percent said it would cut down on high school vocational offerings, and the remaining 40 percent stated it would influence the high school to provide a preparatory function for the area vocational school. Eighty percent of the superintendents stated that they would consider the area schools when assessing the vocational needs of their schools and the remaining 20 percent said it would make no difference in their future plans. In general, the superintendents felt the area vocational schools would increase the saliency of vocational education to the general public.

G. Multiple-Variable Relationships

A preceding section focused on single variable relationships with percentage affirmtive vote. This technique ignores the relationship of all independent variables with the dependent variable (percentage affirmative vote). By using multiple regression, two additional foci are possible, 1) the collective number of independent variables provides an equation that indicates their predictive power of all variables at the same time, (multiple r and multiple r^2), 2)each of the variables can be examined to see how important each is in the regression equation (t value on partial b).

All quantified variables were put into the first regression equation. This regression equation, with 29 independent variables, produced a multiple r of .6039 and an r^2 of .3647. The square of the multiple r accounts for 36 percent of the variance in percentage affirmative vote. Although coefficients this large are commonly found in social science data, this one was not statistically significant. Table 1 shows the importance of the independent variables used in this equation. Each beta weight is independent of the original units of measure, hence an analysis of these weights indicates which variables contribute the most weight in explaining the variance. If a beta weight is twice as large as another, it is twice as important in explaining the variance.

A second regression equation was run on the nine variables shown in Table 2. This table shows the zero-order correlations and the r^2 for each of the nine variables used in the second regression equation. The beta weights and t values on partial b scores for the second equation using these same nine variables are shown in Table 3. The value of the multiple correlation (r) when the 10 independent variables were used to predict percentage affirmative vote was .2928. The multiple r^2 value was +.0857. These values are somewhat smaller than the values obtained in the first equation (29 variables) and still were not significant.

This analysis indicates that passing school bond elections is a relatively complex social action process. There is a great deal of variance from district to district with few significant differences between the successful and unsuccessful districts. Approximately 11 percent of the chi-squares computed for this study were significant. Most of these variables were concerned with variance in responses to economic, demographic and election history variables. Clearly the successful districts engaged in fewer elections, but the successful culmination of a bond issue campaign removes the need for additional elections in the short run in most cases. It also seems that community norms exist of passing and failing bond issues.

A series of zero-order correlations failed to reveal many additional significant differences between the successful and unsuccessful bond elections. It can be concluded that both successful and unsuccessful districts and campaign strategies were quite similar on most dimensions (variables) examined in this study.

Table 1

Multiple Variable Relationships: Percentage Affirmative Vote Dependent and 29 Independent Variables

Variable Name	Beta Weight	t value on partial b
Amount of Issue	-.0027	-.9376
Number of unsuccessful elections in the past five years	-.1566	-.2214
Millage increase as a result of issue	-.1440	-.2481
Assessed evaluation at time of election	-.0001	-.7442
Total school millage levy	.0035	.4168
Total school enrollment	-.0022	-1.6001
Population of school district	.0045	1.7720
Percent eligible voting	.1956	.2184
Total score of existing mass media	-1.1512	-.7626
Total score use of especially prepared mass media	- .0536	-.0832
Total use of interpersonal channels	- .4525	-.6915
Total use of peripheral services	-1.0688	-.8055
How many months early press releases were	.5578	1.4400
How many press releases made	- .0163	-.1315
Degree of responsibility assumed by groups	- .0012	-.0117
Degree of participation of organizations - sum	.0439	.5234
Sum of value of publicity devices	.0286	.3914
Sum of value of devices used	.0676	.8454
Sum of evaluation of education program	.0178	.1488
Sum of survey of present building facilities	- .0974	-.8882
Sum of determination of school building needs	- .0456	-.3685
Sum of selection of architect	.2592	2.0333
Sum of selection of site	- .0217	-.2644
Sum of designing and planning proposed buildings	.0425	.3616
Sum of planning the financing of the building program	- .3971	-3.1500
Total of Superintendent	.0007	.0073
Total of Board and Superintendent	.1035	1.3528
Total of Board of Education	.0948	1.0479
Total of Lay Committee	- .0760	-.8626
Total of Professional Consultant	.1316	-1.5230

$R = .6039$ $R^2 = .3647$

Table 2

Single Variable Relationships: Independent Variable Relationships to Percent Affirmative Vote

Variable Name	r	r^2
Sum of selection of architect	.1320	.0174
How many months early press releases were made	.1062	.0113
Involvement of professional consultant score	-.0844	.0071
Involvement of Board and Superintendent score	.0777	.0060
Involvement of board of education score	.0731	.0053
Amount of Issue	-.0610	.0037
Population of school district	.0254	.0006
Total school enrollment	.0227	.0005
Importance of planning and financing of the building program	-.0204	.0004

Two multiple regression equations were formed, and the results were examined in this section. The equation using 29 variables was not significant. The second equation using the highest beta weights (9 variables) produced a somewhat smaller r and multiple r^2, but these values still were not significant.

This finding further supports the position that data collected from secondary sources and after the occurrence of the election do not permit satisfactory prediction of school-bond election outcomes.

Table 3

Multiple Variable Relationships: Percentage Affirmative Vote and 9 Independent Variables

Variable Name	Beta Weight	t value on partial b
Sum of planning and financing of the building program	-.3713	-3.3450
Sum of selection of architect	.2445	2.1989
Amount of Issue	-.0039	-1.8534
Population of school district	.0038	1.7231
Months early press releases were made	.4906	1.5326
Total school enrollment	-.0017	-1.4245
Involvement of Board and Superintendent	.0527	1.0780
Involvement of professional consultant	.0595	1.0570
Involvement of Board of Education	.0555	.9351

$R = + .2928$ $R^2 = + .0857$

IV. DISCUSSION

An analysis of the data collected in this study indicates that there is no discernible pattern to be followed that assures success in passing a school bond issue. The purpose for which an election was held (including vocational purposes) did not appear to be associated with the outcome of the election. There was a lack of consistency or pattern in the techniques used in the campaign strategies promoting these school-bond elections. As a result, many of the correlations obtained in this study were not related to the percentage affirmative vote, hence not to the outcome. In addition, many correlations were not in the expected direction. In view of the literature review for this project, it was not anticipated that most communications variables (as measured in this study) would be negatively related to election success or, conversely, that the traditional techniques of election communication strategy would correlate highly with the unsuccessful districts.

The size of the issue, percentage of eligible persons voting in the election and traditionally asserted causes of election defeats were not operative in these Iowa school-bond elections. These unanticipated findings led to the consideration of an alternative hypothesis, that different strategies may be used when a close outcome is expected. Data related to the latter point were examined.

Closely contested issues were defined as those receiving from 50.0 percent to 69.9 percent favorable vote. Districts that received large majorities and those that received less than half of the vote were defined as outside the closely contested issues. This resulted in 89 of the 195 districts being classified as "closely contested." The rationale was that if the predicted outcome was much in doubt, different strategies might be used to attempt to secure a favorable vote on the bond issue.

This was not evident, however, in the elections classified as closely contested. The correlations were quite similar to those for all bond issues. There were no significant differences in the demographic, economic, election history or communications variables. This finding was not consistent with the rationale for examining issues in this vote range. It was assumed that different relationships would be found. They were not.

Most evidence collected in this project indicates that there isn't much difference in the situational, election history, economic and campaign strategy variables between the successful and unsuccessful districts. Further, the additional field study of vocational school-bond issues indicates that these elections are quite similar to all other school-bond elections. In addition, it appears that neither the superintendents nor the district electorate think in terms of the vocational portion of the school-bond elections. The election is viewed as an entity, and the vocational portion of the issue was not perceived as exerting much influence on the outcome of the election.

There were limitations in this study. These data represent for the most part the recalled knowledge and attitudes of the superintendents. As such, these perceptions are subject to the usual "decay factor" over an extended time. Some of the elections had been held 5 years before the survey. In addition some of the data are second-order cognitions and are subject to the usual criticism of attributed knowledge and attitudes as perceived by a second person. In most cases, the data are quantitative, not qualitative; e.g., data on using or not using lay committees, not on composition, quality and procedures used by the lay committee. Even with these shortcomings, the researchers are not aware of an equally exhaustive study of data collected at the election source. Many dimensions of the problem have been established and much has been learned to apply to future studies of school-bond elections that are currently underway.

V. CONCLUSIONS

School bond elections in Iowa assume quite similar patterns in the strategies implemented by the superintendents and the boards of education. There were not many significant differences between the successful and unsuccessful districts when compared on the basis of variables used in this study. Economic variables and ratios were quite similar for both groups. Among the largest differences were the correlations between communications media usage and the outcome of the election. Most of the communications media were negatively related to election success. Conversely, most of these same variables were positively correlated with failure in the unsuccessful districts.

A community norm of passing elections or failing to pass them appears operative in many districts. The correlation was +.64 between issue passage and other issues passing within the 5-year period of study. The data collected in this study do not permit intensive examinations of community attitudes and solidarity toward either their community (identity) or their school.

Simple research frameworks and methods normally employed in survey research techniques do not provide insights into an ongoing process such as school-bond decision-making at the community level. A re-examination is needed of strategies based on getting out the vote. Results presented here indicate little relationship between percentage voting and outcome.

The lack of differentiation between elections for vocationally related purposes and those for other purposes suggest that it may not be profitable to examine vocational school-bond elections as an entity, unless the elections are for vocational-education purposes alone. Simple research frameworks and procedures based on impressionistic descriptive studies and data are not sufficient to analyze and make significant predictive statements about the outcome of vocational school-bond elections.

The data analyzed in this report offer little encouragement in predicting outcomes of school-bond elections with single variable relationships used in this study as the basis for prediction Aggregating these variables and correlating them with affirmative vote does produce significant relationships with some variables, but the amount of variation explained is very low. This work provides insights of the type suggested by Merton (13) who suggests that a relatively simple frame of reference should first be used when exploring an area in which sociological theory has not been developed. The authors feel this has been accomplished. Descriptive studies examining variables traditionally thought important in securing school-bond passage do not provide sufficient data to explain this complex community action.

The literature survey indicates that this is the most intensive statistical analysis performed on data collected for this large an N (195). At the same time, other researchers have manipulated secondary data from studies performed in different states and regional areas of the United States. Often the percentage affirmative vote was not the same (50-66.6%), which made it even more difficult to generalize from these findings.

Clearly, the lack of trends and significant correlations found in this study indicates that there was as much variance within as between districts examined in this analysis.

Hence, Merton's exploratory suggestions have been followed without heartening results. However, the degree of confidence has been raised that this kind of community (social system) decision-making is a complex process that requires additional, more sophisticated sociological, social psychological and communication theory, procedures and research to produce significant results. Such an attempt is planned by the Iowa State University rural sociology research team in the near future.

VI. SUMMARY

All Iowa school districts engaging in school-bond elections during the 5-year period (January 1, 1960, to December 31, 1964) were examined. Niney-three percent of the superintendents of these districts responded to a mailed questionnaire requesting information about school-bond elections in their district during this 5-year period. Information was sought about the characteristics of the district prior to their election, the characteristics of the bond proposal, election strategy which included the performance of tasks by various groups and individuals, the timing of the election, communications techniques used, and the perceived reasons for passage or failure of the bond issue. This initial survey also served to establish the number of school-bond elections occurring in Iowa, as well as how many elections included requests for vocational education facilities. When the data were analyzed all districts that had sought vocational facilities were again approached for additional information. Only 24 of the 195 districts had requested vocational educational facilities. Twenty of these 24 superintendents responded to an intensive personal interview concerning the importance of the vocational education portion of their bond issue.

The data were used to compute chi-square, correlation, regression equations and analysis of variance tests. There were some significant differences in the data collected from school districts where issues had passed and in those that failed. The analysis of these statistics led to the following conclusions:

1) Data collected by use of present survey techniques are not sufficient to predict the outcome of school bond issues.

2) Many commonly held generalizations were not substantiated in this study, for example, the data collected in this study do not show that traditional communications techniques either hinder or help the desired outcome of the school bond issue. In most cases there was no significant relationship between technique use and election outcome. When significant relationships were found, they were likely to be negative; i.e., negative relationships between clergy support and issue outcome and providing transportation to the polls and issue outcome.

3) The percentage of registered voters participating in these elections was not significantly correlated with whether the issue passed.

4) Communications techniques used to inform the electorate and to get out the vote were not significantly correlated with voter turnout.

5) Economic variables dealing with millage increase and total millage appear more important than the total amount of the issue in increasing voter turnout.

6) Districts which had passed a bond issue in the 5-year period were most likely to pass another election if one was presented during this period. Conversely,

unsuccessful attempts were most likely to be followed by further failures especially if the issue was voted on in a short period of time.

7) There was no significant association between the demographic characteristics of the district (school population, district size, etc.) and favorable vote.

8) There was little association between the economic variables (amount of issue-millage increase) and percentage favorable vote.

9) Single variable relationships (r) provided relatively small amounts of the explained variance (r^2).

10) The variables quantified in this study did not explain significant amounts of variation when used in multiple-regression equations.

11) Superintendents of successful districts evaluated newspaper coverage as more favorable than did superintendents in districts where the issue failed.

12) The involvement of the Parent Teachers Association was rated somewhat more important by superintendents of successful issues.

13) Vocational education bond issue proposals were quite similar to all other school bond proposals.

14) Vocational education requests in school bond elections were not a salient issue in these Iowa school bond elections.

15) Neither the superintendents nor their district electorate tend to separate the vocational education portion of the issue from the total or attribute election outcome (passage or failure) to the inclusion of vocational education requests.

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BSTRACT *(250 words max.)*

A two-phase study of school bond elections in Iowa is reported herein. The first
ase examines the number and characteristics of all such elections held in Iowa over
5 year period. (N=195) The second phase is a re-interview of the superintendents of
stricts that had sought money for vocational or technical educational purposes. The
rst phase of the project was accomplished by the use of mailed questionnaires. Ninety-
ree percent (195 of 209 eligible) responded to this mailing. Only 24 of the 195
perintendents had engaged in a bond election for vocational purposes. Twenty of these
were located and they responded to an intensive interview centering on what effect the
cational portion of the issue had on the outcome of the election. In addition,
titudes and knowledge about the area vocational schools were sampled.

The results of these two phases indicate that this kind of community decision-
king is a complex process that varies from district to district. The variables
ucators and action-oriented workers assign high priority in achieving success were not
bstantiated in this study. The communications variables (as measured in this study)
re generally not significantly associated with election success. If there was a
gnificant relationship, it was most likely to be a negative correlation with election
ccess.

Presently used secondary data collection techniques and research designs offer
ttle hope in understanding, analyzing and predicting school bond election outcomes.

RETRIEVAL TERMS *(Continue on reverse)*

IDENTIFIERS

OCCUPATIONAL PROBLEMS AND VOCATIONAL TRAINING NEEDS OF HIGH SCHOOL DROP-OUTS FROM RURAL AREAS IN IOWA

Project No. 2
Contract No. O. E. 5-85-108

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I. INTRODUCTION

The continuing exodus of youth from high school before graduation has received increasing attention from both educators and the general public. Scarcely a week passes that either a newspaper or magazine has not carried an article concerned with the dropout problem.

President Kennedy's State of the Union message to congress on January 14, 1963, made reference to the four out of ten students in fifth grade who would not finish high school. This he referred to as a waste we cannot afford. President Johnson reiterated this concern in a recent speech by referring to dropping out of school as playing a game of Russian Roulette.

The National Education Association (4) published a research memo on school dropouts. The memo presented statistics on a nation wide basis to the effect that roughly seven pupils in ten who enter the ninth grade now remain in school through graduation. For Iowa, about 20.9 percent of the ninth grade pupils fail to graduate four years later.

Daniel Schrieber (5) estimated that there will be 26 million young people entering the labor market between 1960 and 1970 with 7 1/2 million being youth with less than 12 years of education. Schrieber further contended that the high rate of unemployment among dropouts was because their training fitted them for jobs which were rapidly disappearing from the labor market.

Perhaps an even more serious but somewhat less obvious aspect of the problem was the costs born to the nation as a result of this undertraining of manpower. Kastner (3) assumed a casual relationship between educational level and income and then derived an average marginal educational income by computing the average additional increment to income resulting from the completion of an additional level of educational training. The average cost of dropping out of high school, according to Kastner, was $65,873 per dropout. Kastner concluded with the following statement:

> "If the dropouts at the various levels had continued their education to that level commensurate with their abilities, national income would be at least twice as large as its current level."

The seriousness of the problem can hardly be overstated.

Greater insight into the dropout problem was provided by studies conducted in two of the larger cities in Iowa. Gronert (1) used the follow-up technique to study male withdrawals from

North High School, in Des Moines. Over 43 percent of the dropouts were unemployed one or more months during the first year after withdrawal. Ware (7) interviewed male students who withdrew from the Fort Dodge Senior High School. Lack of success in required courses, inability to get along with teachers, and discipline problems were cited as factors contributing to student withdrawal.

The study being reported was concerned with the Occupational Problems and Vocational Training needs of High School dropouts. By means of a personal interview, information was gathered and analyzed for the ten year period after the dropouts withdrew from high school.

Objectives

The objectives of this study were:

1. To analyze the job histories and periods of unemployment since leaving school.
2. To verify primary and secondary causal reasons for leaving school.
3. To identify socio-economic and psychological factors causing dropouts.
4. To identify characteristics of the potential dropout.
5. To identify adjustment difficulties after leaving school and job skill deficiencies encountered in entry occupations.
6. To determine vocational training needs immediately after leaving school.
7. To identify attempts by the dropout to improve employability through educational efforts.
8. To determine present occupation and status.
9. To determine present vocational training needs as related to vocational interests and family responsibilities.
10. To utilize the information collected as a basis for curriculum adjustment, improved guidance and other changes to help reduce the rate of dropout.

Hypotheses

The following general form of null hypothesis was postulated, of no difference between value ratings assigned by males and females on courses taken as to interest, difficulty and importance. The chi square statistical technique was used to test the null hypothesis for each of the high school courses taken.

Definition of Dropout

The term dropout as used in this study was used to designate pupils who had completed the eighth grade and were enrolled in the ninth grade, who had been in membership during the regular school term and who had withdrawn from membership before graduating from secondary school or the twelfth grade and without transferring to another school. An individual was considered a dropout whether the dropping out occurred during or between regular school terms.

II. METHOD

Two previous studies designed to determine the need for and interest in vocational-technical education were conducted by Howe (2) and Van Ommeren (6) in 1961. One-hundred and nine high schools from 16 counties in north central and northwest Iowa cooperated in the original studies. The 16 counties were: Bremer, Butler, Cerro Gordo, Chickasaw, Floyd, Franklin, Hancock, Lyon, Mitchell, O'Brien, Osceola, Sioux, Winnebago, Worth and Wright.

In the two studies combined, samples were drawn to include approximately one-fourth of the former students. These samples were taken from a total public school population of 13,000 enrollment in ninth grade for the school years 1952, 1954 and 1956. Questionnaires were used in gathering the data. The two studies yielded replies from 2,624 former students.

Sample

The IBM cards containing the coded information from the two previous studies were sorted and print outs were made for the 224 students identified as dropouts. A list of these individuals was compiled indicating the dropout's name, dropout year, high school last attended and county designation.

County superintendents were sent the list of names for the dropouts from their respective counties and asked to assist in providing current addresses for these individuals. After all 16 counties had reported, the breakdown for addresses was as follows: 127 living in state with known addresses, 40 living out of state, 56 with current addresses unknown, and 1 deceased.

Further attempts to locate the dropouts with unknown addresses were made by contacting high school superintendents and parents. The names of dropouts with current addresses still unknown were turned over to the credit bureau. As a result of these procedures 13 additional in-state addresses were provided, bringing the total number of dropouts with known current addresses in Iowa to 140.

Interview Schedule

A thorough review of the literature preceded the construction of the interview schedule. As new ideas were encountered, they were noted for future reference. Instruments from previous studies were examined and evaluated.

After several revisions, a rough draft of the interview schedule was formulated and copies were given to selected faculty members at Iowa State in the departments of education, statistics, psychology, economics, and sociology for critical evaluation. The schedule was further critiqued by faculty members and students during an educational seminar and by students in the graduate educational research course.

The instrument was pretested using several dropouts from the Ames area and appropriate revisions were made. The final revised schedule contained 47 items which could be classified under the following headings:

1. Personal Characteristics
2. Job Experience
3. Environment and Home Life During High School
4. Occupational and Training Ambitions
5. Opinions Concerning School and Reasons for Dropping Out

A final draft of the interview schedule was cut on a stencil and mimeographed. Eight copies of the schedule with Form 8F-83 attached were sent to the U.S. Office of Education for clearance. Telephone clearance was received on May 27, 1966.

Interviewing

The two graduate students working on the project began conducting personal interviews on June 1, 1966. The interviews continued during June, July and August. Both interviewers had previous experience.

The prospective interviewees were contacted by letter a few days prior to the interview. The letter served as an introduction for the interviewers and contained information about the study.

Coding and Tabulating

The responses to the questions were coded and punched on IBM cards. They were then sorted and tabulated. The analysis of the data was studied, assimilated and interpreted. The results were then classified and reported.

III. RESULTS

The following data were compiled from personal interviews involving 102 former high school dropouts from the following 16 counties in northern Iowa: Bremer, Butler, Cerro Gordo, Chickasaw, Floyd, Franklin, Hancock, Lyon, Mitchell, O'Brien, Osceola, Sioux, Winnebago, Worth, and Wright. The results were arranged under the following headings: present status, job histories, family background, course ratings, occupational interests and training, opinions concerning school and factors related to dropping out, and reasons for dropping out.

Present Status

Many of the dropouts interviewed were living in the same county in which they attended high school. (See Table 1.) The greatest concentration was in Mason City in Cerro Gordo County. (See Figure 1.)

Table 1. Distance of residence from county in which dropouts attended high school

Distance from high school county	Males		Females		Total	
	N	%	N	%	N	%
Same county	24	61.5%	37	58.7%	61	59.8%
Less than 10 miles	2	5.1	5	7.9	7	6.9
10-25 miles	3	7.7	8	12.7	11	10.8
26-50 miles	8	20.5	6	9.5	14	13.7
51-100 miles	1	2.6	3	4.8	4	3.9
Over 100 miles	1	2.6	4	6.4	5	4.9
Total	39	100.0%	63	100.0%	102	100.0%

Of the dropouts interviewed 61 or 59.8% had stayed in the same county and 41 or 40.2% migrated to other counties. This should not be taken as an index for mobility for the population, since only dropouts living in state with known addresses were interviewed. For the original 224 dropouts, if it were assumed that those for whom current addresses were not determined had left their home county, the percentage for those remaining in their home county would drop to 27.2%. The percentage definitely known to have left Iowa was 23.2%. It is strongly suspected that an additional 30.8% had left the state because their current addresses could not be determined. Thus bringing the total number of individuals known or suspected to have left the state up to 54 percent.

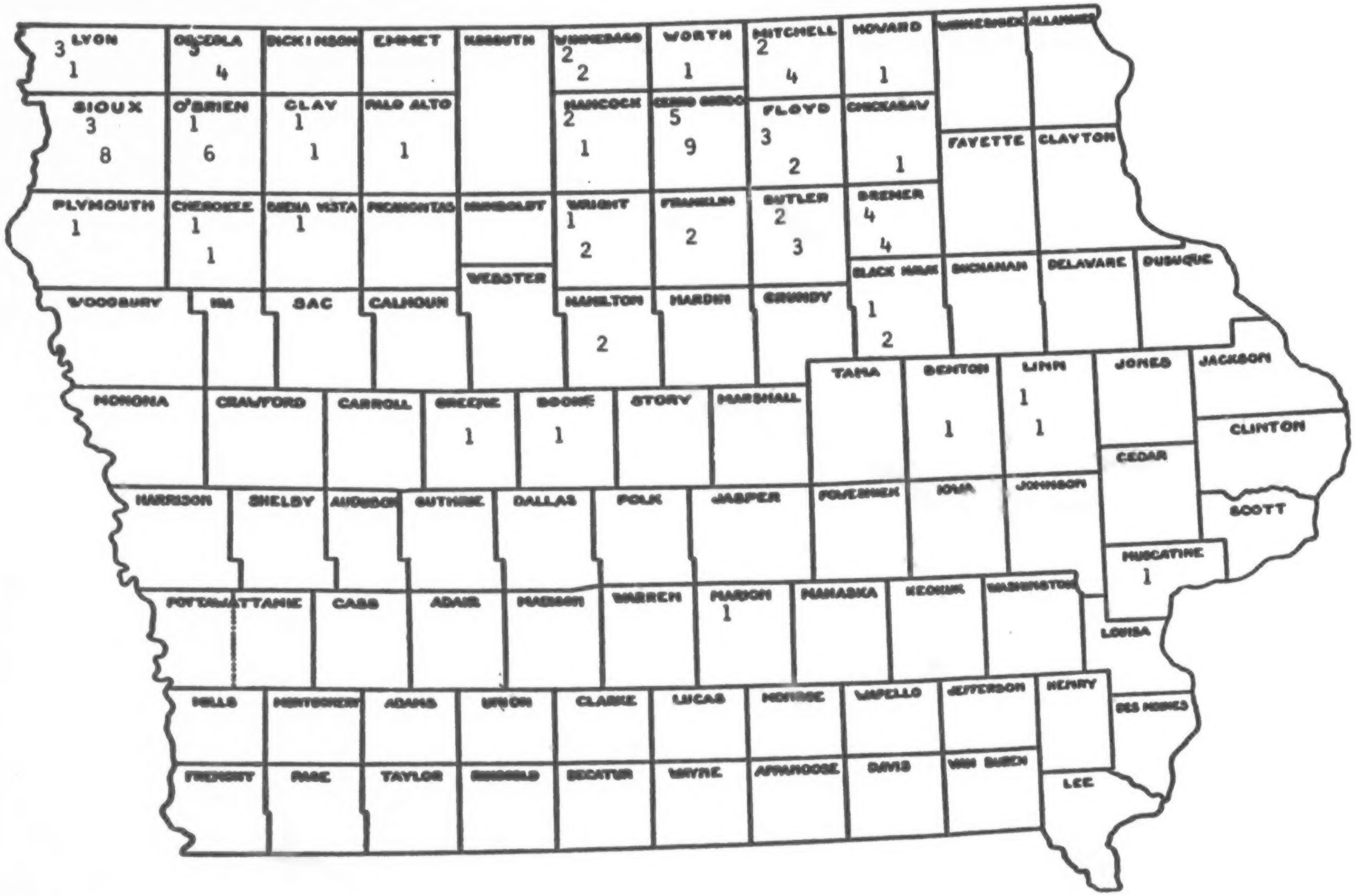
LYON 3 1
OSCEOLA 3 4
DICKINSON
EMMET
KOSSUTH
WINNEBAGO 2 2
WORTH 1
MITCHELL 2 4
HOWARD 1
WINNESHIEK
ALLAMAKEE
SIOUX 3 8
O'BRIEN 1 6
CLAY 1 1
PALO ALTO 1
HANCOCK 2 1
CERRO GORDO 5 9
FLOYD 3 2
CHICKASAW 1
FAYETTE
CLAYTON
PLYMOUTH 1
CHEROKEE 1 1
BUENA VISTA 1
POCAHONTAS
HUMBOLDT
WRIGHT 1 2
FRANKLIN 2
BUTLER 2 3
BREMER 4 4
WEBSTER
BLACK HAWK 1 2
BUCHANAN
DELAWARE
DUBUQUE
WOODBURY
IDA
SAC
CALHOUN
HAMILTON 2
HARDIN
GRUNDY
TAMA
BENTON 1
LINN 1 1
JONES
JACKSON
MONONA
CRAWFORD
CARROLL
GREENE 1
BOONE 1
STORY
MARSHALL
CLINTON
CEDAR
HARRISON
SHELBY
AUDUBON
GUTHRIE
DALLAS
POLK
JASPER
POWESHIEK
IOWA
JOHNSON
SCOTT
MUSCATINE 1
POTTAWATTAMIE
CASS
ADAIR
MADISON
WARREN
MARION 1
MAHASKA
KEOKUK
WASHINGTON
LOUISA
MILLS
MONTGOMERY
ADAMS
UNION
CLARKE
LUCAS
MONROE
WAPELLO
JEFFERSON
HENRY
DES MOINES
FREMONT
PAGE
TAYLOR
RINGGOLD
DECATUR
WAYNE
APPANOOSE
DAVIS
VAN BUREN
LEE

Figure 1. Present residence by county of male (top number) and female dropouts (bottom number) interviewed

All but seven of the dropouts had been married at least once. The average years of marriage was 6.1 for the males and 8.5 for the females. (See Table 3.)

The average number of children for the married male dropouts was 2.29; for the females it was 2.93 (see Table 4). It should be kept in mind that all the dropouts above were less than 32 years old and it is likely that many of the families would have been larger had the study been made at a later date.

Most of the dropouts interviewed were between 24 and 26 years old with the average age being 25.94 years (see Table 2).

Table 2. Distribution of ages of dropouts

Age	Males	Females	Total
23 or younger	3	4	7
24-26	19	38	57
27-29	16	21	37
30-32	1		1
Total	39	63	102

Table 3. Years of marriage of 102 dropouts interviewed

Years of marriage	Males	Females	Total
Less than 2	4	1	5
2-4	7	5	12
5-7	16	18	34
8-11	8	30	38
12-15		5	5
Never married	4	3	7
Total	40	62	102

Job Histories

A dropout was considered to have entered the labor force at the time he took his first job after leaving high school. The average length of time in the labor force was 8.57 years for the males and 3.62 years for the females. The average length of time which had elapsed since leaving school was 9.56 years for the males and 10.92 years for females. For both males and females there was a considerable difference between the time elapsed since leaving school and the length of time in the labor force. A good portion of the difference for the females was attributed to late entry or early exit from the labor market due to marriage and family responsibilities. None of the males had left the labor market, so this difference was attributed to late entry into the labor market due to unemployment in the first years after leaving high school.

Table 4. Number of children of 95 married dropouts

Number of children	Males	Females	Total
None	4	0	4
1	2	5	7
2	15	18	33
3	10	15	25
4	3	20	23
5 or more	1	2	3
Total	35	60	95

A considerable amount of job switching was revealed in the job histories of the dropouts interviewed. The average number of jobs held by the male dropouts was 3.29 and for the females it was 2.47 (see Table 5).

Table 5. Number of jobs held by dropouts since leaving school

Number of jobs	Males	Females
1	5	16
2	8	9
3	10	8
4	9	5
5	2	3
6	2	1
7	1	
8 or more	1	

Most of the dropouts had a history of being farmers or laborers; only two were presently employed in management or sales (see Table 31, 32, and 33, Appendix A.)

Table 6. Median incomes of high school dropouts for three selected jobs

Job	Males	N	Females	N
First job after leaving high school	$59	27	$33	38
Job of longest duration excluding first job and present job	$80	22	$36	26
Present job	$109	34	$50	14

Table 6 was computed from Tables 34, 35, and 36 shown in Appendix A. Median incomes as displayed in the table showed an increase with each successive job held by the dropouts. This increase, especially for the males, could probably be attributed mostly to increased experience in the labor market. However, it should be pointed out that no correction was made for the rising cost of living index.

Each dropout interviewed was asked to rate job satisfaction for each job held. A five point score was used for rating with the numbers one through five corresponding to the following categories: 5-very satisfied, 4-satisfied, 3-indifferent, 2-not satisfied, 1-very dissatisfied. The mean satisfactions for the males for each of the three successive jobs were 2.78, 2.96, and 3.55 respectively; for the females they were 3.25, 2.81, and 3.47 (see Tables 7, 8, and 9). Thus job satisfaction increased for the males as they searched out the labor market for more desirable jobs. No such pattern existed for the females.

Table 7. Job satisfaction for the first job held by the dropouts

Job satisfaction	Males	Females
Very satisfied	9	13
Satisfied	17	18
Indifferent	4	4
Not satisfied	3	2
Very dissatisfied	2	4
No response	4	22
Total	39	63

Table 8. Job satisfaction for the job of longest duration excluding the first and last jobs held by the dropouts

Job satisfaction	Males	Females
Very satisfied	8	9
Satisfied	17	5
Indifferent	2	3
Not satisfied	2	1
Very dissatisfied	1	3
No response	12	37
Total	39	63

Table 9. Job satisfaction for the present job held by dropouts

Job satisfaction	Males	Females
Very satisfied	21	9
Satisfied	17	5
Indifferent		
Not satisfied		1
Very dissatisfied		
No response	1	48
Total	39	63

Family Background

From Table 10 one can observe that many of the dropouts came from large families. The average number of brothers and sisters was 4.03 for the males and 3.70 for the females. The average number of brothers and sisters who dropped out of school was 1.56 for the males and 1.24 for the females (see Table 11). Of the dropouts interviewed 64.1% of the males and 55.6% of the females came from families in which at least one brother or sister had dropped out.

Thirty of the thirty-five male dropouts or 85.7% married wives who had finished high school (see Table 12). Thirty of fifty-nine or 50.8% of the female dropouts married husbands who had finished high school.

The median income for the husbands of the female dropouts was $130 per week (see Table 13). Only two of the males had wives working at the time of the study and both were earning between $60 and $79 per week.

Table 10. Number of brother and sisters of the dropouts

Number of brothers & sisters	Males	Females
0	1	2
1	10	9
2	4	12
3	6	12
4	2	8
5	6	7
6	4	2
7	1	5
8	3	4
9	2	2

Table 11. Number of brothers and sisters who dropped out of school

Number of brothers & sisters who dropped out of school	Males	Females
0	14	28
1	9	18
2	7	2
3	5	7
4	2	3
5	1	1
6	1	2
7		0
8		2

Table 12. Last grade completed by the spouse of the dropouts

Last grade completed by spouse	Males	Females
8th or less	3	13
9th	1	2
10th	0	5
11th	1	9
12th	29	26
some college	1	4
no response	4	4

Table 13. Weekly incomes of the female dropouts' husbands

Weekly income	Number of husbands earning this income
$40-59	3
$60-79	3
$80-99	9
$100-119	5
$120-139	6
$140-159	7
$160-179	4
$180 and above	7
No response	19

The reader is referred to Tables 37 in Appendix A for detail occupational listings of the dropouts' fathers and Table 38 for occupational listing of the female dropouts' husbands.

The median income of the fathers at the time the dropout left school was $92 per week for the males and $87 per week for the females. Seven of the male dropouts' mothers and nine of the female dropouts' mothers were working at the time the dropout left school.

The most frequent grade for dropping out among the boys was 10th and for the girls was 11th. (See Table 14.) None of the dropouts interviewed had completed any college work, although it was learned from one of the county superintendents that one dropout had completed a two year program of study at a junior college and one had graduated from a four year college. Four of the dropouts had returned to high school and finished, five had passed a high school equivalency test, one was taking correspondence course, and one was enrolled in a trade school.

Monthly dropout frequencies, presented in Table 15, were useful in revealing certain periods during the year in which dropping out was most frequent. Referring to Table 15, one can see that the dropout rate seemed to reach three peaks, one during September when school first convened, another during February shortly after the second semester started, and a third during May and June which marked the latter part of the school year and the beginning of summer.

Most of the dropouts in the sample came from relatively small schools with 82.4% reporting class sizes of 75 or less (see Table 16). This would tend to indicate that a relatively high percentage were from rural communities. This contention is borne out in Table 17. Of the boys 56.4% reported a rural residence; 34.9% of the girls reported a rural residence, either rural farm or rural non-farm. For the group as a whole 38.3% resided on a farm during high school.

Table 14. Last grade completed by 102 dropouts interviewed

Grade	Males	Females	Total
8th	4	3	7
9th	8	10	18
10th	15	15	30
11th	8	28	36
12th	2	2	4
Passed high school equivalency test	1	4	5
Taking correspondence courses	1		1
Students in trade school		1	1

Table 15. Reported month of withdrawal for 102 dropouts interviewed

Month	Males	Females	Total
January	2	4	6
February	8	6	14
March	2	3	5
April		3	3
May	14	20	34
June	4	8	12
July			0
August	3	1	4
September	5	5	10
October	1	4	5
November		2	2
December		7	7

Only three of the 102 dropouts interviewed did not reside with their parents during high school. Ninety-one reported parents living together; parents of six were divorced or separated. For five the father was deceased and the mother living, and for three both parents were deceased.

Table 16. Class sizes of dropouts interviewed

Class size	Number of dropouts
Less than 10	1
10-25	28
26-50	38
51-75	17
76-100	4
Over 100	14

Table 17. Residence during high school of 102 dropouts interviewed

Place of residence	Males	%	Females	%	Total	%
Rural farm	22	56.4%	17	27.0%	39	38.3%
Rural non-farm			5	7.9%	5	4.9%
Urban	17	43.6%	41	65.1%	58	56.8%

Course Ratings

Each dropout interviewed was asked to rate high school course areas he had taken according to importance, interest, and difficulty. The dropout had four categories for rating each course; a score of four was given for the highest rating and a score of one for the lowest rating. (See Tables 18 & 19).

Table 18. Mean importance of course areas taken by male dropouts

Course area	Mean rating	N
Industrial Arts	3.593	27
Driver's Education	3.167	12
Mathematics	2.684	38
Bookkeeping/Business	2.500	8
Vocational Agriculture	2.455	11
Science	2.250	36
English	2.158	38
Typing	2.125	8
History, government, and economics	1.714	35

A dropout was not allowed to rate a course area unless he had completed at least one semester in that course area. The right hand column of the table shows the number of dropouts rating each course.

A similar table is shown below for female ratings of twelve course areas.

Table 19. Mean importance rating of course areas taken by female dropouts

Course area	Mean rating	N
Driver's Education	3.658	38
Home Economics	3.491	53
Sociology/Psychology	3.200	10
English	3.032	63
Bookkeeping/Business	2.727	22
Music	2.622	37
Mathematics	2.500	62
Typing	2.167	42
Science	2.000	59
History, government, and economics	1.885	61
Geography	1.813	16
Shorthand	1.778	9

Courses in history, government, and economics were rated low in importance by both the males and females. Special interest courses such as home economics, driver's education, and industrial arts rated high.

As indicated by the tables the males tended to rate science and mathematics higher than the females, and the females rated English higher than did the males. These differences were tested statistically using the original ratings and the X^2 test. Non significant tests at the .05 level resulted for both science and mathematics. However, the test for English was found highly significant at the .001 level.

For males industrial arts, driver's education, and vocational agriculture were most interesting, for females sociology and psychology, driver's education, and home economics were most interesting (see Tables 20 & 21).

It was interesting to note that the required core curriculum courses taken by both males and females (science, mathematics,

Table 20. Mean interest ratings of course areas taken by male dropouts

Course area	Mean rating	N
Industrial Arts	3.704	27
Driver's Education	3.500	12
Vocational Agriculture	3.455	11
Bookkeeping/Business	3.250	8
Typing	3.000	8
Science	2.972	36
Mathematics	2.211	38
History, government, and economics	1.800	35
English	1.526	38

Table 21. Mean interest ratings of course areas taken by female dropouts

Course area	Mean rating	N
Sociology/Psychology	3.800	10
Driver's Education	3.605	38
Home Economics	3.434	53
Bookkeeping/Business	3.409	22
Music	3.324	37
Typing	3.071	42
Shorthand	2.889	9
Science	2.746	59
English	2.619	63
History, government, and economics	2.131	61
Geography	2.125	16
Mathematics	2.081	62

history, government, economics, and English) rated well in the lower half of both tables. Mathematics was rated lowest by females, and English was rated lowest by males.

Females rated English noticeably higher than males. This difference was tested statistically and the X^2 value was significant at the .001 level.

The dropouts were also asked to rate course areas according to difficulty. The scoring for difficulty rating was as follows:

one for not difficult, two for slightly difficult, three for difficult, and four for very difficult (see Tables 22 & 23).

Table 22. Mean difficulty ratings of course areas by male dropouts

Course area	Mean rating	N
English	2.711	38
Mathematics	2.395	38
History, government, and economics	2.176	35
Science	1.944	36
Bookkeeping/Business	1.875	8
Typing	1.625	8
Vocational Agriculture	1.182	11
Industrial Arts	1.000	27
Driver's Education	1.000	12

Table 23. Mean difficulty ratings of course areas by female dropouts

Course area	Mean rating	N
Mathematics	2.365	63
Shorthand	2.111	9
History, government, and economics	1.885	61
English	1.746	63
Science	1.695	59
Geography	1.533	16
Bookkeeping/Business	1.455	22
Typing	1.381	42
Sociology/Psychology	1.200	10
Music	1.135	37
Home Economics	1.113	53
Driver's Education	1.000	38

Driver's education, industrial arts, and vocational agriculture were the least difficult for males; driver's education, home economics, and music were least difficult for females. Mathematics was most difficult for females and English was most difficult for males.

The females rated English considerably higher than the males. This difference was tested statistically and the X^2 value was found significant at the .001 level.

Occupational Interests and Training

The occupations considered most frequently by the males during high school were farming, mechanical areas, and skilled crafts such as carpentry, plastering, drafting, engineering, and electrical areas. The female dropouts were most interested in nursing, and service work such as secretarial, cosmetology, and teaching.

Only 36.5% of the females and 30.8% of the males said that their high school had offered courses pertinent to their occupational interests. Yet only 3 of the 39 males and 4 of the 63 females reported they would have remained in school if such courses had been offered.

Fifty-five and five tenths percent of the males and 56.4% of the females indicated that they would be interested in further job training. Questions asked the dropouts suggested implications for post-high programs in vocational and technical education for occupational training in new area schools. The training desires for males were mostly in skilled craft areas and the specific areas of mechanics, agricultural, drafting, electronics, and welding. Females desired training in secretarial areas, cosmetology, medical technology, and nursing. Most of the dropouts indicated they would prefer to take such training in the evenings on a part time basis due to occupational and household responsibilities.

Twelve of 63 females and 12 of 39 males reported that they had received some special occupational training since leaving school.

Of the males, 51.3% indicated they were interested in a high school equivalency certificate; 68.3% of the females were interested. The dropouts felt the most desirable way of obtaining the certificate was via the test administered by the State Board of Public Instruction.

Opinions Concerning School and Factors Related to Dropping Out

Seventeen of the 39 male dropouts and one of 63 female dropouts interviewed owned their own car during high school.

Table 24. Number of extra-curricular high school activities for 102 dropouts interviewed

Number of extra-curricular activities	Males	Females
None	13	20
1	8	12
2	11	13
3	5	8
4	1	5
5	1	2
6		2
7 or more		1

The most frequent extra-curricular activities listed were sports for the males and band or chorus for the females (see Table 24). The average number of activities was 1.38 for the males and 1.95 for the females. A X^2 test for difference using three degrees of freedom was found non-significant at the .05 level.

The most frequent hobbies of the dropouts during high school were bowling, roller skating, and going to movies.

Twenty-two of the male dropouts and three of the female dropouts reported that they had missed school for employment or for work at home. The most common reasons for missing were farm work for the family during heavy seasons and farm or housework to help out because of illness or injury in the family.

Twenty-six of the females and 18 of the males said they had repeated one or more courses or grades during school. 12.8% of the males and 42.1% of the females ranked themselves in the upper half of their class; 38.5 of the males and 19.0% of the females reported they were in the lower fourth of their class (see Table 25).

Table 25. Rank in class as reported by 102 dropouts interviewed

Rank in class	Males	Females
Upper 1/4	0	5
Second 1/4	5	21
Third 1/4	19	25
Lower 1/4	15	12
Total	39	63

Table 26. Last grade completed by the parents of 102 dropouts interviewed

Last grade completed	Males		Females	
	Fathers	Mothers	Fathers	Mothers
4th or less	1	0	0	0
5th	1	0	1	1
6th	6	1	6	4
7th	5	2	2	1
8th	16	18	25	20
9th	0	0	2	5
10th	3	1	6	4
11th	1	2	2	3
12th	2	11	10	17
college	1	2	2	3
didn't know	3	2	7	5

Thirty-three of the 39 male dropouts' fathers and 44 of the 63 female dropouts' fathers had not finished high school (see Table 26). Twenty-four of the 39 male dropouts' mothers and 38 of the 63 female dropouts' mothers had not finished high school.

Table 27. Influence of parents for remaining in school

Did parents urge dropouts to remain in school	Males	Females
Yes	27	33
No	11	29
No response	1	1

Table 28. Influence of friends for dropouts' remaining in school

Did friends urge dropout to remain in school	Males	Females
Yes	22	17
No	16	45
No response	1	1

Twenty-seven of the 39 males and 33 of the 63 females said that parents urged them to remain in school. (See Table 27.) A smaller number of friends urged the dropouts to remain in school (see Table 28). Seven of the males and seven of the females reported that their best friend was out of school at the time they dropped out.

Twenty-two of the males and 42 of the females said their teachers seemed interested in them. Thirty-two of the males and 51 of the females claimed their teachers gave individual help when asked.

Thirteen of the males and 18 of the females reported a dislike for certain teachers or school officials. All 13 of the males and 11 of the females said this contributed to their dropping out.

One male and two females reported having unpleasant experiences with other students. Four males and six females reported unpleasant experiences with teachers.

Five of the males and nine of the females reported they were unhappy living at home.

Five of the males and four of the females had previously dropped out of school, reentered, and finally dropped permanently.

Table 29. Length of time dropout had considered leaving school

Length of time	Males	Females
Spontaneous decision	6	7
Less than 1 month	6	11
1-3 months	17	32
3-6 months	3	4
6 months to 1 year	3	4
More than 1 year	2	1

Dropping out of school is often regarded as a process rather than a single event. Only 6 of the males and 7 of the females reported dropping out was a spontaneous decision (see Table 29). The most frequent length of time the dropouts had considered leaving school was one to three months.

Reasons for Dropping Out

Marriage or pregnancy topped the list of reasons for dropping out for the females (see Table 30). Males listed loss of interest or dislike of school and courses most frequently as the major reason for dropping out.

Table 30. Major reasons for dropping out given by 102 dropouts interviewed

Reason	Males	%	Females	%
Marriage or pregnancy	3	7.7	36	57.1
Loss of interest or dislike of school and courses	18	46.2	10	15.9
Teacher difficulty	4	10.3	4	6.3
Academic difficulty	5	12.8	3	4.8
Health reasons	1	2.6	4	6.3
Financial reasons or desire to work	1	2.6	3	4.8
Personal reasons i.e. lack of clothes, non-acceptance by peers, unfriendly cliques, etc.	1	2.6	2	3.2
Enlistment in armed forces	2	5.1		
Change of schools	1	2.6	1	1.6
Unhappy home life	1	2.6		
Divorce of parents and necessary to work	1	2.6		
Illness of father and necessary to help with the farm work	1	2.6		

Opinions of the Dropouts on Selected Topics

The dropouts interviewed were told of the following situation:

> One community in California assigns a local businessman as an advisor to potential dropouts. He takes the student on various outings such as sporting events, plays, or sometimes lunch.
> After they become well acquainted they discuss the student's future occupational and educational plans.

Thirty-eight of 39 males thought this was a good idea; twenty-three females reacted favorably to the statement, thirty-five were undecided, and five were opposed. Several of the dropouts commented that such a program might have kept them in school.

Responses by the dropouts interviewed as to ways in which their school could have been more helpful were distributed as follows:

22 - Curriculum expansion or course improvement (implication for occupational education)

8 - Special teachers or classes for slow learners
6 - Teacher improvement
3 - More individual help
2 - Better counseling
2 - Improvement of social climate, i.e. less cliques, etc.
2 - Better background in reading, spelling, and phonics
2 - Extra-curricular improvement.
Numerous other comments not classified.

IV. DISCUSSION

In general the dropouts interviewed were friendly and quite cooperative. Interviewers were careful to stress the importance of the study without identifying it as a dropout study. Women especially were quite receptive, frequently conversing after the interviews were completed. The male dropouts tended to be a bit more skeptical about giving up a half hour of their time.

Difficulty was encountered in finding the dropouts' residences or in finding them at home in a number of cases. Since the interviewers were working from a fixed list with no replacements possible, numerous callbacks were necessary to assure a sufficient number of completed schedules.

It was learned in attempting to locate a number of dropouts that their parents had been tenants on rented farms. Such families tended to be quite mobile and often left no forwarding address.

Of the 140 dropouts on the original list, twelve had moved out of state, thirteen had moved and left no forwarding address, two others had been evicted from their dwellings, and one was in the State Penal Institution in Fort Madison. Two calls were not made, one because of a warning by the State Board of Health due to infectious hepatitus and one because of a warning by police and postal authorities not to enter the premises. Appointments for interviewing could not be arranged for eight of the dropouts. Only two outright refusals were encountered.

Thirty-nine males and 63 females were interviewed for a total of 102 of the original 140. A greater number of completed schedules for females than males was due mostly to unavailability of the males during the working day. Nearly all of the completed schedules for the male dropouts resulted from evening calls.

In some cases respondents had difficulty in understanding terminology of certain questions. Although each interview was designed to take about a half hour, a number took over 45 minutes. In these instances repeated explanation of questions and probing by the interviewers for clear responses prolonged interviews.

The fact that many of the dropouts were of a lower than average socio-economic class became apparent as interviewing progressed. Most of the dropouts came from large families. Many had parents who had not graduated from high school and had brothers and sisters who also had dropped out. Most of the parents were farmers or laborers; few had parents in the professions, management, or sales.

For the dropouts themselves only two were employed in management or sales, the rest being farmers or laborers. A number of the dropouts were untidy in their personal appearance.

Perhaps one of the most remembered facets of interviewing was the appearance of their housing. Scarcely any of the dropouts lived in what could be classified as the nicer areas of town. In fact, interviewers could frequently identify the dropouts' dwellings by unkept front lawns, porches in need of repair, or housing with an old, shabby appearance.

V. CONCLUSIONS

Only in a few cases was the decision to leave school a spontaneous one for the dropout, and for this reason has been sometimes referred to as the dropping out process. Often teachers, school officials, or parents could have provided that timely little extra encouragement which might have kept the dropout in school. Because of the necessity to identify the potential dropout before withdrawal, increasing attention has been placed upon identifying characteristics common to most dropouts. The description that follows generalizes the characteristics of dropouts in this study.

Most dropouts came from families of a low socio-economic class. Frequently the families were large and already had a history of brothers or sisters dropping out of school. Parents seldom had a high school education and frequently had less than eight years of formal education. Fathers tended to be employed as craftsmen, farmers, or laborers.

The dropouts themselves often showed a marked disinterest in school and related activities. Very few took an active part in extra-curricular activities. Dislike of certain teachers or school officials was common.

Course interests tended to be in areas other than the traditional core curriculum of English, mathematics, history and science. Females disliked mathematics and males showed a strong dislike for English. Of all the courses required, core courses were taken most frequently and hence the dislike for school was often intensified.

Frequently the potential dropout had a history of scholastic failure and usually ranked in the lower half of his class.

Vocational interests for the males tended to follow the craft lines frequently similar to their fathers. Auto mechanics and farming were frequent occupational goals for the males; secretarial work and nursing interested the girls.

Recommendations

1. Expanded curriculum offering to include additional vocational or technical courses.
2. To utilize information on characteristics of potential dropouts for early identification and corrective action.
3. Special assistance to pupils having difficulty especially in core curriculum courses.
4. To provide expanded guidance services.
5. Utilizing high school coop programs when vocational courses cannot be offered.
6. To provide an opportunity for the development of interest and motivation.
7. To make adult or correspondence courses leading to a high school certificate available especially to girls who had dropped out of school because of marriage.
8. Follow-up and assistance to dropouts in securing employment or additional training.

VI. SUMMARY

Data for this study were compiled from personal interviews involving 102 former high school dropouts from the following counties in northern Iowa: Bremer, Butler, Cerro Gordo, Chickasaw, Floyd, Franklin, Hancock, Lyon, Mitchell, O'Brien, Osceola, Sioux, Winnebago, Worth, and Wright. The dropouts interviewed had been out of school from six to fourteen years.

All of the 102 dropouts interviewed were living in Iowa with about half living in the same county in which they had attended high school. Of the original 224 dropouts considered for the sample slightly over 50% had left the state.

Nearly all of the dropouts were married, the female dropouts having been married an average of 8.5 years and the males 6.1 years. The average number of children was 2.93 for the females and 2.29 for the males.

The existence of nearly a year gap between elapsed time since leaving school and length of time in the labor force for the males, was attributed to adjustment and unemployment difficulties in the first years after leaving school. The median income for the males was $59 per week for their first job after leaving high school and $109 per week for their present job. Nearly all of the dropouts interviewed claimed to be satisfied with their present job.

Present occupations of the males were distributed as follows: 13 farmers, 1 managerial, 1 sales, 7 craftsmen, 8 operatives, 1 janitor, 2 farm laborers, 5 general laborers, and 1 unemployed. Present occupations of the females were distributed as follows: 47 housewives, 1 managerial, 2 craftsmen, 1 operative, 8 private household workers, 1 farm laborer, 3 general laborers.

Most of the dropouts came from large families and frequently had brothers and sisters who also had dropped out. Many had parents who had not finished high school. Approximately 30% of the dropouts' fathers were farmers, occupations for the rest being nearly evenly distributed among the major census classifications of managers, craftsmen, operative, and laborers.

Each dropout interviewed was asked to rate high school course areas he had taken. The males rated industrial arts and driver's education highest in both importance and interest. English was rated lower in interest than any other course taken by the male dropouts. Sociology and psychology, home economics, and driver's education rated highest for the females in both interest and importance. The traditional core courses of English, mathematics, history, and science were rated least interesting and most difficult by both the males and females.

The following general form of null hypothesis was postulated of no difference between value ratings by males and females on courses taken as to interest, difficulty, and importance. The only course for which the null hypothesis was rejected was English, the chi square value being highly significant. The males ranked English less important, less interesting, and more difficult than did the females.

Fifty-five and five tenths percent of the males and 56.4% of the females indicated that they would be interested in further job training. Questions asked the dropouts suggested implications for post-high programs in vocational and technical education for occupational training in new area schools. The training desires for males were mostly in skilled craft areas and the specific areas of mechanics, agricultural, drafting, electronics, and welding. Females desired training in secretarial areas, cosmetology, medical technology, and nursing. Most of the dropouts indicated they would prefer to take such training in the evenings on a part time basis due to occupational and household responsibilities.

Twelve of 63 females and 12 of 39 males reported that they had received some special occupational training since leaving school. Of the males, 51.3% indicated they were interested in a high school equivalency certificate; 68.3% of the females were interested. The dropouts felt the most desirable way of obtaining the certificate was via the test administered by the State Board of Public Instruction. Through this or similar procedures one male and four females had obtained their High School equivalency certificate. Four of the original dropouts had returned to school and obtained their high school diploma.

Several additional factors contributing to dropping out were examined. They included lack of extra-curricular interests, owning a car, missing school for employment or work at home, low academic standing, influence of parents and friends, reported lack of interest and individual help given by teachers, dislike of teachers or school officials, unpleasant experiences with teachers or other students, an unhappy home life, and a record of previous dismissals or withdrawals from school.

The most common reason for dropping out was loss of interest or dislike of school and courses for the males and marriage or pregnancy for the females.

Thirty-eight of the male dropouts and twenty-three of the females reacted favorably about having an advisor from outside the school system. A number commented such a program might have kept them in school.

Some of the dropouts' suggestions for school improvement included curriculum expansion to include various types of vocation-technical education, special teachers, and classes for slow learners, more individual help, and better counseling.

VII. REFERENCES

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APPENDIX A: ADDITIONAL TABLES

Table 31. Detail census classification of first occupations of dropouts after leaving high school

Code Number	Occupation	Male	Female
	Homemakers		
040	Housewife	-	22
	Total		22
	Farmers		
100		7	-
	Total	7	
	Managers, Officials, & Proprietors, Except Farm Managers		
290		-	2
	Total		2
	Clerical and Kindred Workers		
310	Bookkeepers	-	1
	Total		1
	Sales Workers		
490	Salesmen and sales clerks	1	6
	Total	1	6
	Craftsmen, Foremen, & Kindred Workers		
510	Carpenters	1	
544	Machinists	1	
550	Auto Mechanics	1	
552	Radio & T.V. Repairmen	—	1
	Total	3	1

Table 31. (Continued)

Code Number	Occupation	Male	Female
	Members of Armed Forces		
595		11	-
	Total	11	
	Operatives and Kindred Workers		
610	Apprentice plumbers and pipe fitters	1	
621	Auto Service Attendants	2	
644	Meat Cutters, except Slaughter		1
683	Truck & Tractor Drivers	1	—
	Total	4	1
	Private Household Workers & Service Workers		
720	Babysitting		2
730	Hospital Attendants	1	5
754	Cooks, except Private Households		1
784	Waitresses		14
790	Service Workers, except Private Households	—	3
	Total	1	30
	Farm Laborers and Foremen		
820	Farm Laborers, wage workers	4	
830	Farm Laborers, unpaid family	2	
	Total	6	
	Laborers, Except Farm		
970	Laborers	5	
	Total	5	
	Unemployed		
XXX		1	
	Total	1	

Table 32. Detailed census classification of job of longest duration excluding first and last jobs held by dropouts

Code Number	Occupation	Male	Female
	Homemakers		
040	Housewife		37
	Total		37
	Farmers		
100		2	
	Total	2	
	Managers, Officials, & Proprietors, Except Farms		
290	Managers		1
	Total		1
	Clerical and Kindred Workers		
302	Attendants, Physician's & Dentist's Office		1
310	Bookkeepers		1
342	Shipping & Receiving Clerks	1	—
	Total	1	2
	Sales Workers		
400	Advertising Agents & Salesmen	1	
490	Salesmen and Sales Clerks	—	2
	Total	1	2
	Craftsmen, Foremen, & Kindred Workers, Armed Forces		
510	Carpenters	1	
522	Excavating, Grading, & Road Machine Operators	1	
574	Plumbers & Pipe Fitters	1	
595	Members of Armed Forces	4	
	Total	7	

Table 32. (Continued)

Code Number	Occupation	Male	Female
	Operatives & Kindred Workers		
643	Laundry & dry cleaning operatives		1
644	Meat Cutters, Except Slaughter	1	
681	Switchmen, Railroad	1	
682	Taxicab Drivers & chauffeurs		1
683	Truck & Tractor Drivers	2	
690	Operatives & Kindred Workers	2	—
	Total	6	2
	Service Workers & Private Household Workers		
720	Private Household Workers		1
730	Attendants, Hospital & Other Institutions		1
754	Cooks, Except Private Household		1
750	Bartenders		1
784	Waitresses		10
790	Service Workers, Except Private Households	1	—
	Total	1	14
	Farm Laborers & Foremen		
820	Farm Laborers, wage workers	3	
	Total	3	
	Laborers, Except Farm & Mine		
970	Laborers	7	
	Total	7	
	Unemployed		
XXX		1	
	Total	1	

Table 33. Detailed census classification of dropouts' present occupations

Code Number	Occupation	Male	Female
	Homemakers		
040	Housewife		47
	Total		47
	Farmers		
100		13	
	Total	13	
	Managers, Officials, & Proprietors, Except Farm Managers		
233	Manages Service Station	1	
290	Managers	—	1
	Total	1	1
	Craftsmen, Foremen, & Kindred Workers		
500	Bakers		1
510	Carpenters	1	
515	Electricians	1	
540	Linemen & servicemen	1	
544	Machinists	1	
552	Radio & T.V. Repairman		1
553	Repairmen, Railroad & Shop	1	
554	Mechanics & Repairmen	1	
574	Plumbers & Pipe Fitters	1	—
	Total	7	2
	Operatives & Kindred Workers		
603	Apprentice Electricians	1	
610	Apprentice Plumbers & Pipe Fitters	1	
683	Tractor & Truck Drivers	3	
690	N.E.C.[a]	3	1
	Total	8	1

Table 33. (Continued)

Code Number	Occupation	Male	Female
	Private Household Workers & Service Workers		
720	Private Household Workers		2
730	Attendants, Hospital & Other Institutions		3
770	Janitor	1	
784	Waitresses		3
	Total	1	8
	Farm Laborers & Foremen		
820	Farm Laborers, Wage Workers	2	
870	Farm Laborers		1
	Total	2	1
	Laborers, Except Farm & Mine		
970	Laborers	5	3
	Total	5	3
	Unemployed		
XXX		1	
	Total	1	

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[a] Not Elsewhere Classified

Table 34. Weekly incomes for the first jobs dropouts held after leaving high school

Weekly income	Males	Females
Less than $20	2	3
$20-39	5	23
$40-59	7	7
$60-79	7	2
$80-99	4	2
$100-119	1	1
$120-139		
$140-159		
$160-179	1	
No response	12	25

Table 35. Weekly incomes for the job of longest duration excluding first and last jobs held by 102 dropouts interviewed

Weekly income	Males	Females
Less than $20		2
$20-39	3	14
$40-59	5	7
$60-79	4	1
$80-99	7	2
$100-119	2	
$120-139	2	
$140-159		
$160-179	1	
No response	15	37

Table 36. Present weekly incomes for 102 dropouts interviewed

Weekly income	Males	Females
Less than $20	1	3
$20-39	2	2
$40-59	1	5
$60-79	3	2
$80-99	6	
$100-119	10	1
$120-139	2	
$140-159	3	1
$160-179	3	
Over 180	3	
No response	5	49

Table 37. Detailed census classification of occupations of dropouts' fathers

Code Number	Occupation	Number
	Farmers And Farm Managers	
100	Farmers (owners and tenants)	30
	Total	30
	Managers, Officials, & Proprietors, Except Farm	
230	Managers & Superintendents, Building	2
232	Owner & Manager, Grocery	1
233	Manager, Service Station	3
290	N.E.C.	7
	Total	13
	Sales Workers	
490	Salesmen	2
491	Partsman	1
	Total	3
	Craftsmen, Foremen, And Kindred Workers	
510	Carpenters	5
522	Excavating, Grading, & Road Machine Operators	1
523	Foremen	1
544	Machinists	1
550	Mechanics & Repairmen, Auto	1
573	Plasterers	2
594	N.E.C.	1
	Total	12
	Operatives & Kindred Workers	
624	Brakemen, Railroad	1
644	Meat Cutters, Except Slaughter	1
681	Switchmen, Railroad	1

Table 37. (Continued)

Code Number	Occupation	Number
	Operatives & Kindred Workers (Cont.)	
683	Truck & Tractor Drivers	9
690	N.E.C.	1
	Total	13
	Service Workers, Except Private Households	
770	Janitors	1
	Total	1
	Farm Laborers & Foremen	
820	Farm Laborers, Wage Workers	1
	Total	1
	Laborers, Except Farm & Mine	
970	Laborers	9
	Total	9

Table 38. Detailed census classification of occupations of female dropouts' husbands

Code Number	Occupation	Number
	Professional, Technical, & Kindred Workers	
036	Editors & Reporters	1
	Total	1
	Farmers & Farm Managers	
100	Farmers (owners & tenants)	9
	Total	9
	Managers, Officials, & Proprietors, Except Farm	
232	Owner & Manager, Grocery	1
290	N.E.C.	3
	Total	4
	Sales Workers	
490	Salesmen	2
	Total	2
	Craftsmen, Foremen, & Kindred Workers	
501	Blacksmiths	1
504	Brickmasons, Stonemasons, And Tile Setters	1
510	Carpenters	3
540	Linemen and Servicemen	1
544	Machinists	3
550	Mechanics, Auto	1
552	Mechanics, Radio & T.V.	1
554	N.E.C.	1
555	Millers, Grain, Feed, Etc.	1
561	Molders, Metal	1
564	Painters	1
575	Pressmen And Plate Printers	1
	Total	16

Table 38. (Continued)

Code Number	Occupation	Number
	Operatives & Kindred Workers	
621	Attendants, Auto Service & Parking	1
624	Brakemen, Railroad	1
644	Meat Cutters, Except Slaughter	1
683	Truck & Tractor Drivers	8
685	Welders & Flame Cutters	1
690	N.E.C.	1
	Total	13
	Service Workers, Except Private Households	
790	N.E.C.	1
	Total	1
	Farm Laborers & Foremen	
810	Farm Foremen	1
	Total	1
	Laborers, Except Farm & Mine	
950	Lumbermen, Raftsmen, & Woodchoppers	2
970	Laborers	8
	Total	10

APPENDIX B: COPY OF LETTER TO DROPOUTS

June 1, 1966

DEPARTMENT OF EDUCATION (Letter previously addressed to each dropout)

We are conducting a study concerning vocational education and job training needs of selected individuals from rural Iowa, and we need your help. In this constantly changing world, as present jobs change and new jobs arise, new skills and special training or retraining are necessary. Iowa hopes to meet this challenge by setting up new Area Vocational and Technical Schools. Your interests, needs and suggestions will be considered in planning curricula for these new schools.

You may remember being included in an earlier study conducted in 1961 dealing with technical and vocational training. Your answers at that time were important and very helpful in determining the need for these new schools. Five years have elapsed since then and we are interested in additional information. In the near future, Larry J. Coppola and Kermit A. Buntrock, two graduate students from Iowa State University, will be calling on you for a personal interview. We sincerely hope that you will permit them to arrange a time, at your convenience, for the interview.

It is realized that some of the information will be of a confidential nature. Please be assured that it will be treated as such. The information will be coded into numbers and processed electronically. This will insure anonymity. Anything released publicly will be in terms of totals and averages.

You are the only person who is able to provide this necessary information. It is quite possible that the information you provide will be very influential in determining not only the educational programs in Iowa but may also influence economic policy in the area of education and employment.

Your assistance and cooperation will be greatly appreciated. Thank you.

Yours sincerely,

Trevor G. Howe

Trevor G. Howe
Associate Professor
of Education

TGH/ls

APPENDIX C: INTERVIEW SCHEDULE

INTERVIEW SCHEDULE - SURVEY OF OCCUPATIONAL PROBLEMS AND VOCATIONAL TRAINING NEEDS OF HIGH SCHOOL DROP-OUTS FROM RURAL AREAS IN IOWA

INDIVIDUAL NUMBER______________

DATE OF INTERVIEW________________

I. Personal Characteristics

1. Name:____
   Last First Middle Maiden Name

2. Present Address:____
   Street City County State

3. High School Last Attended:

   ____________________________High School______________________
   City County State

4. Last year attended high school: 19

5. Sex:
   (1) Male
   (2) Female

6. Birth Date:________________________________ Age:____________

7. Are you:
   (1) Single
   (2) Married
   (3) Widowed
   (4) Divorced
   (5) Remarried

8. (a) How long have you been married (Please circle) 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15______

   (b) Number of children: 1 2 3 4 5 6 7 8 9 10________

9. At present do you:
    (1) Rent a house
    (2) Rent an apartment or duplex
    (3) Buying a home
    (4) Rent a room
    (5) Live with parents
    (6) Live with wife's parents
    (7) Other____________________

10. (a) Last high school grade completed: 8 9 10 11 12 ______

(b) Month and year you withdrew from school ____________

11. About how many were in your class the last year you were in high school?________________________

12. (a) Where did you live during school?
    (1) With parent(s)
    (2) With guardian(s)
    (3) Other_________

(b) Were your parents:
    (1) Living together
    (2) Separated
    (3) Divorced
    (4) Deceased

(c) During high school was your residence:
    (1) Rural farm
    (2) Rural nonfarm
    (3) Urban

(d) If rural, were your parents:
    (1) Farm Owners
    (2) Owner-Renters
    (3) Renters

13. Do you live in the same county now as where you went to school?__________

(If no) About far do you live from the county in which you went to school?__________________

14. About how far from your home is your place of work?______

15. Religious affiliation: Parents ______________________

(entirely voluntary) Yours______________________

II. Job Experience

16. (a) Did you have any part-time jobs while you attended school? Yes No

	Job Title	Employer's Name	Wages Hour	Hours Week
(1)				
(2)				
(3)				

(b) Did you have any summer jobs? Yes No

	Job Title	Employer's Name	Wages Hour	Hours Week
(1)				
(2)				
(3)				

17. We are interested in what you have been doing since you left school. What was the first job you held? (Interviewer will fill in next page)

Employment Period (to Nearest Month)	Employer's Name and Address	Job Title and Description	Means of Obtaining job.	Wages/Hour	Hours/Week	Gross Pay (include unemployment comp.)	Reason for leaving job.	*How satisfied were you with the job?

(a) Have you ever experienced any difficulty in finding employment

(b) Were you ever turned down for a job for which you applied?

What reasons did the employer give?

*1. Very Satisfied
2. Satisfied
3. Indifferent
4. Not Satisfied
5. Very Dissatisfied

III. Environment and Home Life During High School

18. Do you have any brothers and sisters? (Complete form below.)

	Age	Last School Grade Completed	Job Title	Employer	Gross Pay
Use B or S	___	___	___	___	___
	___	___	___	___	___
	___	___	___	___	___
	___	___	___	___	___
	___	___	___	___	___
	___	___	___	___	___
Husband or Wife (whichever appropriate)	___	___	___	___	___
Father	___	___	___	___	___
Mother	___	___	___	___	___

19. What was your father's job when you left school? Did your mother have a job?

	Occupation	Job Description	Employer	Average Yearly Salary
Father				
Mother				

20. (a) Did your family ever move while you were in school?
    Yes No

    (b) (If yes) How many times?____________________

    (c) (If yes) During which grades did you switch schools as a result?

    (Circle Grade) 1 2 3 4 5 6 7 8 9 10 11 12

21. (a) Did you have your own car while you went to school?
    Yes No

(b) Did you use the family car? (1) Often
(2) About the same as other kids
(3) Seldom
(4) Never

22. Did you participate in any sports or other activities such as speech, debates, band, etc. while you were in school? (Please list)

Any activities outside of school such as 4-H, Boy Scouts, etc? (Please list)

23. What other activities or hobbies occupied your time (i.e. movies, sporting events, bowling, car cruising, youth center, local hang-out, pool, etc.).

24. Did you ever miss school for employment or for work at Home? Yes No (If yes) When and under what conditions?

IV. Physical Disabilities

25. Do you have a physical disability which has lasted for 6 months or longer or which is likely to last that long? Yes No

(a) If no, draw lines through b to g and go on with question 26. If yes, ask the following:

(b) Specify type (heart ailment, T.B., nephritis, etc. or record your own observation).

(c) How old were you when the disability began?________

(d) Has the disability prevented your getting a job? Yes No

(e) Has it limited the kind of job you can take? Yes No (If defect obviously does, record your observation without asking the question.)

(f) Would you like to help in preparing yourself for work?

(1) Yes____; (2) No____; (3) Feels vocational training is impossible for him for physical reasons___; (4) Does not expect to be in labor force for reasons not connected with disability (marriage, etc.)_____; (5) No clear response_____.

V. Occupational Training and Ambitions

26. What occupation(s) did you consider while you were in school?

27. Did your school offer any courses which would help you in this job?

28. Have you had any job training since you left school? Yes No

Name of School Organization	Course or Training	When & How Many Months	Did you Complete

29. (a) Have you served active duty in the military service? Yes No

(b) How long were you in the military service?______________

(c) Did you secure any special training while in the military service? (specify) Yes No

____

____

____

30. If you had an opportunity at the present time would you like to enroll in any job training? Yes No

(IF "NO", SKIP TO QUESTION 33.)

31. For what occupation (what specific job) would you like to be trained? Or would you like to have additional training or retraining for your present job?

32. When could you attend such training? (1) Full time
(2) Part time

If part time:

(1) Mornings	(3) Evenings
(2) Afternoons	(4) Saturdays

33. What financial cost would you be willing to pay, if any?

(1) None
(2) Transportation only
(3) Tuition and transportation

34. Would you be interested in obtaining a high school equivalency certificate? Yes No

(If yes) Which of the following ways of obtaining the certificate would be best for you?

(a) By passing a two hour test administered by the State Board of Public Instruction.

(b) By taking equivalent course work in a special school, such as will be offered in the Iowa area schools.

(If b) When could you attend such training?

(1) Full time
(2) Part time

If part time:

(1) Mornings	(3) Evenings
(2) Afternoons	(4) Saturdays

VI. Opinions Concerning School and Reasons for Dropping Out

36. (a) In terms of your present occupation rate the following high school course areas according to their value to you.
(b) How interesting was the course?
(c) How difficult was the course?

			VALUE				INTEREST				DIFFICULTY			
COURSE	NOT OFFERED	NUMBER OF SEMESTERS TAKEN	VERY IMPORTANT	IMPORTANT	LITTLE IMPORTANCE	NO IMPORTANCE	VERY INTERESTING	INTERESTING	SLIGHTLY INTERESTING	NOT INTERESTING	VERY DIFFICULT	DIFFICULT	SLIGHTLY DIFFICULT	NOT DIFFICULT
MATHEMATICS														
ENGLISH														
SCIENCE (GEN, BIO, CHEM)														
DRIVERS EDUCATION														
INDUSTRIAL ARTS (SHOP-WOOD AND METAL-ELECTRICITY)														
BOOKKEEPING AND BUSINESS														
SOCIOLOGY AND PSYCHOLOGY														
FOREIGN LANGUAGE														
HISTORY AND ECONOMICS(GOV'T)														
TYPING														
JOURNALISM														
GEOGRAPHY														
ART														
SHORTHAND														
MUSIC														
HOME ECONOMICS														
DISTRIB. ED.														
OFFICE OCCUPATIONS														
TRADE AND INDUSTRIAL														
VOCATIONAL AGRICULTURE														
OTHER														

36. (a) Did you encounter any academic difficulty while in school? Have you repeated any grades? (Interviewer should determine which grades or courses.)

(b) How would you rank yourself?
- (1) Upper quartile
- (2) Second quartile
- (3) Third quartile
- (4) Lower quartile

37. (a) In what ways do you think your school could have been more helpful to you?

(b) What occupational or technical courses would you have taken in high school if they had been offered?

(c) If such courses had been offered, would you have remained in school?

38. Were your closest friends out of school? Yes No

39. Did your family urge you to stay in school? Yes No

Did your friends? Yes No

40. Did your teachers seem interested in you? Yes No

41. Did teachers give you individual help when you asked? Yes No

42. Did you have a dislike for any of your teachers or school officials? Yes No

Did this contribute to your dropping out? Yes No

43. Did you have any unpleasant experiences with other students? Yes No Teachers? Yes No

44. Were you happy living at home? Yes No

(a) Before you finally dropped out of school had you previously left and re-entered school? Yes No

(If yes) When?

(b) How long had you thought about leaving school before you finally dropped out?

45. Why did you leave school before completing the 12th grade?

In your own words describe what happened when you left?

What would have kept you in school?

46. One community in California assigns a local businessman as an advisor to potential drop-outs. He takes the student on various outings such as sporting events, plays, or sometimes lunch.

After they become well acquainted, they discuss the student's future occupational and educational plans. Do you think that such a system has merit? Might it have kept you in school?

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ABSTRACT *(250 words max.)*

This study was concerned with the occupational problems and vocational training needs of high school dropouts. By means of a personal interview, information was gathered and analyzed for the ten year period after the dropouts withdrew from high school.

Starting with 224 dropouts, in the sample, 50% had left the state. All of the 102 dropouts interviewed were living in Iowa, one-half residing in the same county as when attending school. Most of the dropouts came from large families and frequently had brothers and sisters who also had dropped out. Males gave lack of success or interest and females marriage or pregnancy as major reasons for leaving school.

A difference of nearly a year in unaccountable time since leaving school and length of time in the labor force for the males, was attributed to unemployment and lack of job skills in the first years. Median income for the males was $59 per week, first job and $109 per week present job.

Dropouts' response had implications for post-high school programs of occupational training in the new area schools. About 55% of the males and 56% of the females indicated they would be interested in further job training. Male interests were in the skilled craft areas, mechanical, agricultural, drafting, electronics, and welding. Female interests for training were in secretarial, cosmetology, medical technology, and nursing. Twelve females and twelve males reported they had received some special occupational training since leaving school.

16. RETRIEVAL TERMS *(Continue on reverse)*

17. IDENTIFIERS

INTERRELATIONSHIP OF HOME ENVIRONMENT AND EMPLOYMENT

Project No. 3
Contract No. O. E. 5-85-108

Marguerite Scruggs
Mary Fern Souder

November 1966

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I. INTRODUCTION

A. The Problem and Background

The belief that there is a positive relationship between characteristics of the home environment and achievements of the man in the work world has been supported by labor, industry, business, and education; however, there is little tangible evidence establishing the validity of this relationship. Although there is much research on either home environment or achievement on the job, there is little research studying the relationships between the two.

Increased knowledge of these relationships for which vocational education provides training in non-metropolitan areas of the United States is needed. Such knowledge could serve as one basis for determining the purposes that need achieving and the people who need serving by vocational education.

B. Review of Related Literature

1. Importance of work in life. Society's ordering is a matter of man's relation to the work world. Hughes (11, p.42-43) maintains that a man's work is one of the characteristics by which he is judged and one of the more significant characteristics by which he judges himself. It is an important part of his social identity and a determinant of his fate in life. If work is one of the most important elements for self and societal evaluation, it behooves educators to help workers attain a level of employment that allows for greatest self-achievement.

2. Relationships between employment and other aspects of life. As early as 1938 Hall and Locke (7, p. 90-91) were investigating possible relationships between employment aspects and life outside the factory. In a study conducted in a British factory they concluded that very few workers could divide their lives into two water-tight compartments, life inside and life outside of the factory. An unsatisfactory life outside of the workroom reduced efficiency within it and might even render a worker completely unfit for industrial life. Men and women who expressed worry about debts or illness of a near relative were unable to give their undivided attention to their work. Hall and Locke further reported that workers who were kept in severe subjection at home often resented factory discipline and tried to assert their independence by behaving rudely or by refusing to cooperate with others. On the other hand, young workers bearing unduly heavy domestic burdens were apt to regard the workroom as

a providential opportunity for making arrears of fun before they returned to their real life work at home.

Hartman (9, p. 160) studied the relationship between marital adjustment and job adjustment. In his pilot study of 71 attendants at a public hospital, he found significant relationships between marital adjustment and job adjustment for both men and women. In the second phase of the study, 75 additional subjects were interviewed and the relationship decreased in significance for the men but remained high for the women.

Kornhauser (13, p. 187) found that factory workers in small towns tended to have higher life satisfaction than similar workers in Detroit. He also found that family relationships were more unfavorable for semiskilled factory employees in Detroit than for comparable small town workers (13, p. 191).

Aberle and Naegele (1, p. 132) found that the occupational role of middle-class fathers influenced their attitude toward socialization of children. The fathers evaluated their children in terms of middle-class occupational expectations.

3. Research concerning families of industrial workers. The critical need for research dealing with working-class families was expressed by Sexton (19, p. 81) and Komarovsky (12, p. 5). The latter points out that there are basic differences between families of blue-collar workers and middle-class more highly educated professional persons. The study of 58 blue-collar marriages was similar to the present study in the design for collecting the data.

4. Occupational aspirations and environmental factors. Haller and Miller (8, p. 127) found occupational aspiration for boys related to psychological factors, including personality adjustment, emotional stability, lack of nervous tension, super ego strength, sophistication, and independent self-sufficiency. Dole (2, p. 90-91) also found boys' occupational aspirations were related to occupational level of the father. Dyer (3, p. 90) in a survey of family reactions to the father's job, concluded that the studies were consistent in showing that most blue-collar workers did not want their children to follow their line of work. This contrasted with the general trend of the sons to follow in their fathers' footsteps.

5. Employment and aspects of home economics. Research has been conducted relating employment and aspects of home economics including clothing, food and nutrition, management, and housing. For example, Form and Stone (4, p. 4) and Stone and Form (20,p.25)

studied certain clothing behaviors and employment criteria. They found that the white-collar worker was extremely concerned about the attention co-workers in his work environment gave to his occupational dress, but the manual worker was often unaware that others may judge him by his clothing. They also reported that the lower the income of the husband, the higher the reports of clothing deprivation of the wife. Rosencranz (18, p. 3) found that wives in higher-prestige occupations and income groups bought more dresses in "high prestige" specialty shops or "better" department stores than did wives of manual workers and low income groups. Also, significantly more wives in the manual worker group said that their purchases were based mainly on economic considerations. Sexton (19, p. 83) characterized blue-collar wives as receiving greatest satisfaction when buying clothing for their children, but white-collar wives found buying clothing for themselves more satisfying.

Haggard and Greenberg (6, p. 2) studied the relationship between nutrition and work productivity and found that productivity increased with improved diets. Gray (5, p. 7) found that productivity decreased when caloric intake was reduced.

Hill (10, p. 457) studied the relationship between consumership and the income and husband's occupation and found that the employment variables did not predict consumership. Patterson (17, p. 76-77) found that blue-collar workers accounted for up to 60 percent of the market potential for certain goods and that blue-collar families bought approximately 40 percent of all top-priced refrigerators, washing machines and sewing machines sold.

Improved housing did not produce heightened job aspirations in a study of Baltimore Negro slum residents conducted by Wilner, Walkley, Pinkerton and Faybark (22, p. 250). This was concluded on the basis of information gained through personal interviews and public-agency records of 1,000 families.

C. Objectives

The objectives were:

1. To identify some characteristics and possibly patterns of characteristics of the home environment of skilled, semiskilled and unskilled workers that appear related to the husband's employment record.

2. To test various methods of obtaining information.

3. To develop a rationale consistent with the findings and including hypotheses to be tested later in a more comprehensive study of relationships between employment and home environment.

II. METHOD

Because of the exploratory nature of this study and the limited experience of researchers in working with manufacturing companies and unions, the bases for choosing and analysis of the different procedures were an important part of the research.

A. Definition of Population and Sample

The population of ultimate concern in this study was skilled and semiskilled workers along with their families in fields for which vocational and technical education assume instruction responsibility. This exploratory study focused upon skilled, semiskilled or unskilled laborers of manufacturing companies. One reason for choosing manufacturing was that any relationships that might exist between home environment and job performance in this field seemed less obvious than would be true in other kinds of work for which vocational education provides training and in which the wife plays some more direct role in a man's job.

1. Selection of manufacturing company. After compiling a list of manufacturing companies in a selected midwestern nonmetropolitan area and consulting with experts in industrial psychology, sociology and engineering extension, the researchers tentatively selected a company. Conferences were held with officials of the company who conferred with local union officials. Arrangements were worked out for conducting the study using procedures satisfactory to the company, union and researchers.

The company chosen was a well-established manufacturing firm, which had maintained good labor-management relations over a period of years, manufactured metal products and employed sufficient workers to provide for the sample size desired. In this study, the existing wage groups were arbitrarily categorized into 11 groups ranging from unskilled to semiskilled to skilled trades.

2. Identification of sample of employees. Two sets of criteria were set up for specifying the characteristics of employees and their families to be included in the study. One set identified characteristics all participants were expected to have in

common; the other, characteristics that were to distinguish between the two groups. The common characteristics included:

1. Each man was married with his wife living at home and employed outside the home less than 20 hours per week.
2. Each family included one or more children under age 18 living at home.
3. Each man was initially employed by the company during 1951 through 1955 and had been continuously employed ever since.
4. Each man at the time of employment had either completed eighth grade, had completed some high school but had not been graduated or had been graduated from high school.
5. Each was 20 to 40 years old at the time of first employment.
6. Each was first employed by the company in one of the three lowest wage groups. Five exceptions were made to this in Group 2.

The criterion used for differentiating between the two groups was the wage group at the time of the study. Group 1 consisted of men employed in the first three wage groups and Group 2, of men employed in upper wage groups.

Records revealed 47 men who met the Group 1 criteria, and 31 met Group 2 criteria, with the five exceptions as to the beginning wage group as noted in the preceding paragraph. Data for all 78 employees were obtained from the company.

Judgment sampling was used in preference to random sampling in selecting 20 employees from each of the two groups. This was done to have the two groups comparable on educational level at time of first employment and as different as possible on the known employment variables. For each group five men had an eighth grade education, five had more than eighth grade but less than high school graduation and 10 had been graduated from high school.

The principal investigator selected and prepared a list of the names and addresses of the first 40 selected. Names were alphabetized by family name and no one except the principal investigator could identify any employee's criterion group. As interviewers reported ineligible families, the principal investigator selected alternates until 20 eligible families had been interviewed in each criterion group.

Of the eight employees found ineligible for Group 1, six were ineligible because the wife was employed more than half-time and two were separated or divorced from their wives. The five ineligible employees in Group 2 had wives who were working more than half-time outside of the home. Three homemakers refused to participate indicating they were too busy.

B. Selection of Employment Variables

Variables used in describing employment records were determined from data recorded by the company; validity of these data was judged by company representatives, researchers and consultants; data availability was determined by the policies of the company and the union; and consideration was also given to whether the kinds of data available from this company would also be available from companies included in later studies. Variables selected included wage group at the time of the study, years employed by the company, upward mobility in the company, income, absenteeism, accidents and suggestions to the company.

Two measures of upward mobility were used: the number of successful bids upward and the distance measured in terms of wage groups between the wage group at the time of the study and the wage group at the time of first employment.

Income measures included income received from the company, income earned from other sources and the total income. Because of an agreement between the union and the company, no information about an individual's wages could be revealed to the researchers by the company. Data on income were in the form of income categories based on quantity as shown on the form directed to the employee and left at the home for him to fill out.

The possibility of obtaining ratings of workers by supervisors was considered. After discussing this with company representatives, the researchers decided that there were no ratings available that would be reliable or valid for this study.

C. Selection of Home-Environment Variables

Because this research was designed to serve vocational education programs, it focused on those behaviors in the home that education can hope to change. Some additional types of data useful to educators in planning meaningful instruction were also included.

The scope of home economics also helped determine the choice home environment characteristics. The study was limited to those aspects of the home that the researchers and consultants believed would be related to employment achievement. Home environment aspects were categorized as: family composition and educational level, clothing, food and nutrition, management, social and psychological characteristics, housing, family relationships, child development and health.

D. Development of the Interview Schedule

Because the amount and type of data required from the homemaker were comprehensive and in some instances of a personal nature, an important aspect of data collection was building rapport with the respondent. A personal interview in which the researchers could have direct contact with the homemakers in their homes, be alert to information beyond that included in the interview schedule and assure the homemaker all responses were confidential was chosen.

Two professional home economists developed and revised the interview schedule with guidance from the principal investigator and consultants. Only the wives were interviewed because of time limitations and the complications of interviewing the husband independently at his home or on the job.

The completed instrument was submitted to the U. S. Office of Education for approval the latter part of February 1966. Final clearance for use of the instrument was granted March 24, 1966, and notification of this action was received by Iowa State University in a letter dated April 13. The instrument was also submitted to company and union officials for their constructive criticism and approval.

In its final form the interview schedule for the homemaker required approximately two hours to complete.

E. Questionnaire for Husband

At the end of the interview each homemaker was asked if she would solicit her husband's cooperation in obtaining his approximate income from the company and other sources and help him keep a record of dietary intake for a three-day period. These data were picked up by the interviewers on a return visit approximately four days after the interview.

F. Training of Interviewers

Seven pilot interviews were conducted in central Iowa in nonmetropolitan areas as the research instrument was being developed. After each day of interviewing, the research instrument and interviewing techniques were evaluated. Both interviewers attended a one-day clinic conducted by the department of home management to train interviewers for research planned by that department, and both had completed a college course in research methods.

G. Collecting the Data

Data for the study were collected from three sources: the cooperating company, the homemaker and the employee. Procedures used in collecting and recording the data are described in this section.

1. Obtaining data from the company. The company prepared a form for each employee containing data used in determining employee eligibility for this study and requested data related to the employment record. This information was presented to the researchers at a conference with company representatives on April 15, 1966.

2. Contacting the participants by mail. A letter signed by company and union officials was mailed to the selected employees and their wives on approximately May 1, 1966, before the beginning of the interviews of the homemakers on May 4. The letter stated that the company and the union were cooperating with the study, briefly described the interest of the researchers in obtaining information regarding homemaking practices of wives of working men for use in vocational education programs and encouraged cooperation with the interviewers who would be contacting the homemakers, When the interviews had been completed, the principal investigator wrote to each of the employees and their wives who had received the earlier letter from the company and union.

3. Conducting the interviews. The interviewing began on May 4, 1966, and was completed on June 14, 1966. An attempt was made to complete two interviews each day. Except for a few cases in which schedules of the homemaker made an appointment necessary, the interviewers made no appointments with the homemakers, but arrived at the home about 9:00 a.m. or 1:00 p.m. To express appreciation for her cooperation at the end of each interview, the interviewers gave the homemaker a recipe pamphlet (16) and a list of publications (14) available through the office of her local county home economist.

The two interviewers cooperated in the interviews. Each conducted parts of the interviews, served as a reliability check of judgments made about the home situation and assisted with care of children or other responsibilities that could help free the homemaker to participate in the interview.

4. Reporting the interviews. After each interview, the two interviewers made independent ratings of selected variables and independently recorded on a dictation machine supplementary information and impressions received. The information was transcribed and filed with other data for each case.

H. Analyzing the Data

As a means of identifying home environment characteristics that may be related to employment records of skilled, semiskilled and unskilled workers, three different methods of analysis were used. These included comparing the means of the two criterion groups, examining the intercorrelations among 116 variables within each of the criterion groups and for the total sample of 40 families, and developing an analysis of case studies.

Comparing the two criterion groups provided a source of clues to possible variables associated with the home environment that may be related to variables descriptive of employment records. The sampling method used was not designed for estimating employee characteristics because no estimate of sampling error was possible. The attempt was to maximize the differences between the two groups on employment variables to increase the visibility of any differences in home-environment variables.

Although only limited conclusions can be reached on the basis of intercorrelations among 116 variables for samples of 20 and 40, this method of analysis was used to identify related variables that could be combined into clusters to reduce the number of variables to be discussed and to provide clues to possible relationships among characteristics of home environment and employment behaviors. Variables were not combined into clusters unless they also appeared logically related. The Computation Center at Iowa State University computed the correlations. Coding, or scoring, is shown in the Appendix.

For the total sample and the two groups of 20, 116 variables were intercorrelated. At the one and five percent levels of significance, respectively, around 67 and 335 correlations were not significantly different from zero. The number of correlations significantly different from zero at the one and five percent levels, respectively, were 435 and 1007 for the total sample, 165 and 563 for Group 1, and 272 and 745 for Group 2. Throughout the report of results the correlations mentioned are those based on the total sample unless otherwise indicated. In selecting relationships to report, weight was given to the correlation's level of significance, the clustering of variables and the relationship's judged importance in the light of the study's purposes.

The case study method provided a means of intensively studying all the data about each family. At the time of this report the analysis of the case studies was incomplete.

Some of the variables have not been analyzed for this report. For example, so few employees had accidents that this variable was dropped. Also, the information regarding child development and some data regarding other home-employment variables were not included because of the time limitations of an 18-month study.

III. RESULTS

The results are reported in four sections. First, the sample of employees is compared with those in the population not included in the sample. The remaining three sections report the findings on employment variables, home-environment variables and the relationships between the two types of variables. In the latter three sections results from comparison of the means of the two groups, inspection of intercorrelations among variables and analysis of case studies were combined and reported together.

A. Comparison of Sample with Others in Population

The 40 employees included in the sample had similar characteristics to those not included in the sample in each of the respective criterion used in identifying eligible employees. Data are shown in Table 1. The largest difference between the sample and the non-sample within either group was for the mean age of employees in Group 1.

The non-sample employees in Table 1 represent those not selected for the sample as well as those who were selected and found ineligible for some reason other than an employment variable.

The data in Table 1 show that the researchers were not able to keep the two groups alike on beginning wage group, years employed by the company and age of the employee. There were fewer men in the company who had begun employment in one of the three lowest

Table 1. Means for criteria used in identifying criterion groups of employees by sampled and non-sampled groups

Variable	Group 1 Sample (n=20)	Group 1 Non-sample (n=27)	Group 2 Sample (n=20)	Group 2 Non-sample (n=11)
Planned to be common				
2. Beginning wage group	2.0	1.9	3.8	4.4
68. Years employed by company	11.6	11.8	14.0	14.0
12. Age in years	35.6	37.3	40.1	39.9
23. Educational level in school years	10.6	10.3	10.7	11.3
Planned to be differentiating				
3. Wage group at time of study	2.2	2.2	10.2	10.3

wage groups and were at the time of the study in one of the upper wage groups than men who had begun work in one of the first three wage groups and were employed in approximately the same wage group at the time of the study. As replacements were made in the sample for Group 2 it was necessary to include one man who began in wage group four and four men who began in wage group 11.

When it was necessary to include employees who were first employed by the company from 1951 to 1955 instead of any one year to have enough eligible employees in Group 2, it was assumed that a minimum of ten years would give any employee an opportunity to advance to one of the upper wage groups.

B. Family Descriptions

The composition of the 40 families who participated in the study along with the ages and educational levels of the parents is shown in Table 2. Comparison shows the parents in Group 2 were not only older when this study was carried out but were also older than those of Group 1 when their first children were born. Although the two groups of families included approximately the same number of children, the children in Group 2 tended to be slightly older than those in Group 1. Almost all children in the 40 families were still living at home.

Table 2. Group means for characteristics of families including age, education, and number of children

Variable		Group 1	Group 2
12.	Age of husband in years	35.55	40.10
13.	Age of wife in years	31.45	35.50
21.	Age of husband when first child was born	24.45	27.15
22.	Age of wife when first child was born	21.00	22.30
23.	Education of husband in school years	10.60	10.70
24.	Education of wife in school years	10.80	11.60
14.	Number of children of pre-school age	1.15	.65
15.	Number of children in elementary school	1.75	1.50
16.	Number of children in high school	.35	.95
18.	Number of children at home	3.25	3.10
20.	Total number of children	3.50	3.45

Although the educational level of the husbands in the two groups was comparable, the wives in Group 2 had a higher educational level than the wives of Group 1. One family in Group 1 had two children and one family in Group 2 had one child who had quit school before completing high school. All other children of school age were still in school.

C. Employment Variables

The employment variables included clusters of variables and individual variables and were named criterion group, seniority, mobility, absenteeism, suggestions to company, wages and other employment. The intercorrelations among the employment variables are shown in Figure 1. Criterion group is a cluster composed of variables one and three, the original criterion group and the wage group at the time of the study. Seniority is represented by the single variable 68, number of years employed by the company. Mobility is a combination of variables four, distance between beginning wage group and wage group at time of the study, and five, the number of successful bids upward. Variables eight, nine and 10, the number and hours of absences as well as absence due to illness, comprise absenteeism. Suggestions to the company operated independently of all except variable 11 as shown in Figure 1. Variable six, wages from the company in 1965, is treated as an independent variable. Other employment is composed of income from other sources, number of part-time jobs held by the employee and extent of farming as part-time job of the employee, or variables seven, 25 and 26.

No employment variable was entirely unrelated to the others as shown in Figure 1. Criterion group was positively related to seniority, mobility, suggestions to company and wages and seniority to mobility and wages. Absenteeism was negatively correlated with wages and positively correlated with other employment.

The means for the two criterion groups on the employment variables are shown in Table 3. The means for Group 2 employees were consistently higher than those for Group 1 on mobility, suggestions to the company and wages.

The data on absences from work, however, were inconsistent with the results on the other employment variables related directly to the company. Although the number of absences was approximately the same for the two groups of employees in 1965, those in Group 2 were absent for slightly more hours than those in Group 1.

According to Table 3, the employees in the two groups averaged about the same number of part-time jobs in addition to their work at the company, but Group 2 workers received slightly more income from their part-time employment. The extent of farming as a source of income other than the company was minor in terms of the number of employees involved. Four of the men in Group 1 were farming from 40 to 240 acres each, and three of the men in Group 2 were farming, with one raising livestock on a small acreage, one farming 13 acres and one farming 360 acres. Although less than half of the employees

Variable[a]	1	3	68	4	5	8	9	10	11	6	7	25	26
1													
3	96[b]												
68	63	62											
4	78	75	73										
5				32									
8													
9						94							
10						73	82						
11	36												
6	45	43	53			-36	-35	-43					
7						37							
25											53		
26						37	34				70	37	

[a] Code for variables:

Criterion group
  1. Group number (1 or 2)
  3. Wage group at time of the study
Seniority
  68. Number of years employed by company
Mobility
  4. Distance between beginning wage group and wage group at time of study
  5. Number of successful bids upward
Absenteeism
  8. Number of absences
  9. Total hours absent
  10. Absences due to illness
Suggestions to company
  11. Number of suggestions to company
Wages
  6. Wages from company for 1965
Other employment
  7. Income from other sources
  25. Number of part-time jobs held by employee
  26. Extent of farming as part-time job by employee

[b] In this and subsequent figures only correlations significantly different from zero at the one to five percent levels are included. For n=40, $r_{.01} = .40$ and $r_{.05} = .36$. All decimal points are omitted.

Figure 1. Correlation matrix for employment variables

Table 3. Means on employment variables by criterion group

Variable	Group 1	Group 2
Criterion group		
3. Wage group at time of study	2.20	10.20
Seniority		
68. Number of years employed by company	11.60	14.00
Mobility		
4. Distance across wage groups[a]	.25	6.70
5. Number of successful bids upward	2.25	2.65
Absenteeism		
8. Number of absences in 1965	4.55	4.50
9. Hours of absence in 1965	15.00	18.00
10. Hours of absence due to illness in 1965	7.15	9.25
Suggestions to company		
11. Number of suggestions submitted to company	10.25	20.20
Wages		
6. Annual wages from company in 1965	$6,550.00	$7,450.00
Other employment		
7. Income from non-company sources	$325.00	$370.00
25. Number of part-time jobs of employee	.35	.40
26. Extent of farming[b]	.40	.25

[a] Number of existing wage groups between beginning wage group and wage group at time of study.

[b] Code: 0=none, 1=raising livestock or farming 40 acres or less, 2=farming 109-150 acres, 3=farming 240-360 acres. All acreages reported were included in the coding.

reported incomes from sources other than the company, some men were committing major amounts of time to one or more part-time jobs.

The distribution of reported wages from the company and income from other employment is shown in Table 4. No man in Group 1 reported income in the highest category of wages from the company or from other employment. The range for Group 2 extended from the lowest to the highest categories for income from both sources.

Table 4. Distribution of reported incomes from company and other sources by group

Income	Group 1	Group 2
Wages from company		
$4,000 - 5,499	2	1
$5,500 - 6,999	12	3
$7,000 - 8,499	6	15
$8,500 - 9,999	0	1
Income from other sources		
None or less than $100	11	12
$100 - 999	6	3
$1,000 - 1,999	1	4
$2,000 - 2,999	1	0
$3,000 - 3,999	1	0
Over $4,000	0	1

D. Home-Environment Variables

The characteristics of the home environment include clusters of variables and individual variables. Results are reported for social participation of the family; housing; psychological characteristics of the wife; food, nutrition, and health; clothing; management of resources; family relationships; and authority patterns.

The intercorrelations among the variables describing social participation of family members are shown in Figure 2. With the exception of social mobility, the scores on all variables contributed to the family's social participation index. The correlation of .82 between variables 32 and 33 indicates that two-thirds of the variance in the social participation index for the family is in common with the wife's social participation index.

As shown in Table 5, the families of Group 2 had a higher mean score for the social participation indexes and were judged on the average somewhat more upwardly mobile socially than Group 1 families.

Variable		31	32	33	61	62	63	64
No. of organizations entire family	31							
Social participation index, wife	32	76						
Social participation index, family	33	84	82					
No. of organizations, church focus	61	59	58	45				
No. of organizations, community focus	62	56	53	43				
No. of organizations, entertainment	63	46	40	52		39		
No. of organizations, youth and socialization	64	40		38				
Social mobility	114	41	62	50		47		

Figure 2. Correlation matrix for social participation and mobility

Table 5. Mean social participation and mobility by criterion group

		Group 1	Group 2	Possible range
33.	Social participation index of family	4.55	5.15	0-16[a]
32.	Social participation index of wife	5.80	6.60	0-23[a]
31.	Number of organizations to which entire family belongs	5.35	6.55	actual no.
61.	Number of organizations with church focus	1.00	.85	actual no.
62.	Number of organizations with community focus	.60	1.15	actual no.
63.	Number of organizations with entertainment focus	.50	.30	actual no.
64.	Number of organizations with youth socialization focus	.70	.65	actual no.
114.	Social mobility[b]	3.50	3.90	1-5[c]

[a] Actual range for this sample. A score was calculated by weighting the number of organizations, extent of participation, and offices held. Detailed instructions for calculating may be found in the Appendix.

[b] Judgment based on interview data.

[c] Code: 1=downwardly mobile, 3=static, 5=upwardly mobile.

Group 2 families belonged to somewhat fewer church-related and entertainment organizations and to more organizations focusing on the community than did Group 1.

The measures of social participation, housing, psychological characteristics of the wife and management of resources appeared positively related to each other. Social participation correlated positively with the educational level of the wife and identification of religious leaders as a source of help with family problems.

The cluster of housing variables is shown in Figure 3. This variable was the only one that did not significantly relate to all other variables in the cluster.

Housing correlated negatively with number of children in the family. And that part of the housing cluster dealing with cleanliness, orderliness, aesthetics and repair of furnishings correlated negatively with the cluster on patriarchal authority pattern and with the extent to which handing down clothing was a source of family clothing. Housing correlated positively with educational level of the wife for items dealing with cleanliness and orderliness. Housing also correlated positively with the husband's hanging up his own clothing, the frequency with which the husband ate alone and prepared his own breakfast, the preference of the wife for one dress worth 14 dollars over two worth seven dollars, and the wife's judgment that the family had enough money for clothing.

Variable		27	28	29	34	35	37	38	39
House type	27								
Neighborhood	28	78							
Housing density	29	41	42						
House cleanliness	34	67	48						
House orderliness	35	64	52	35	86				
Aesthetic qualities	37	69	51	39	81	75			
Furnishings in repair	38	71	46		83	62	74		
Essential furnishings	39	67	48		69	62	71	76	

Figure 3. Correlation matrix for housing

In addition to the cluster of items dealing with housing, the comparison of housing means for the two groups shown in Table 6 includes three items dealing with attitude of the wife toward the housing. Wives of Group 2 were less satisfied with the housing and made more suggestions for improvement of the house. The means for house type and neighborhood were superior for Group 2, but the scores on cleanliness and orderliness were superior for Group 1.

Figure 4 reports the correlation matrix for a cluster of variables entitled psychological characteristics of the wife. These variables were the means of the judgments made independently by the two interviewers immediately after the interview. Bases for the judgments are explained in the Appendix.

Table 6. Mean characteristics related to housing by criterion group

Variable	Group 1	Group 2	Possible range
Housing			
27. House type	3.30	3.45	1-7[a]
28. Neighborhood	3.50	3.60	1-7[b]
29. Density	1.42	1.39	No. persons per room
34. Cleanliness	1.35	1.25	0-2[c]
35. Orderliness	1.35	1.05	0-2[c]
37. Aesthetic qualities	.90	.95	0-2[c]
38. Furnishings in repair	1.15	1.20	0-2[c]
39. Essential furnishings	1.15	1.05	0-2[c]
Attitude of wife toward housing			
50. House meets needs better now than when family moved in	.85	.65	0-1[d]
51. Difficult to get improvements	.35	.60	0-1[d]
67. Number of suggestions for house improvement	.95	1.35	Actual no.

[a] Code: 1=very poor, 2=poor, 3=fair, 4=average, 5=good, 6=very good, 7=excellent. See appendix for further explanation.

[b] Code: 1=very low, 2=low, 3=below average, 4=average, 5=above average, 6=high, 7=very high.

[c] Code: 0=poor, 1=medium, 2=good.

[d] Code: 0-no, 1=yes.

Variable		54	55	56	57	58	59
Self-actualization	54						
Self-esteem	55	81					
Ability to verbalize	56	53	66				
Ability to understand questions	57	66	67	68			
Willingness to express ideas	59	31	31	31	39		

Figure 4. Correlation matrix for selected psychological characteristics of the wife

Psychological characteristics of the wife correlated positively with educational level of the wife and extent to which the husband used leisure time for recreational activities. Some variables correlated with the number of home-related tasks performed by the husband, the wife's knowledge of food and nutrition and the number of newspapers to which the family subscribed. The psychological characteristics also correlated positively with the type of clothing worn by the husband to work and the extent to which the wife reported that her husband was conscious of the clothes that she wore. They correlated negatively with the extent to which the wife identified behaviors that would occur at work if her husband dressed differently from his fellow workers.

The first five variables included in Table 7 represent the wife's psychological characteristics. The wives of Group 2 had higher means than those of Group 1 on the first four variables. There was essentially no difference between the two groups in terms of willingness to express ideas.

The last three variables in Table 7 are treated as independent variables. They did not correlate with other variables in the table except for correlations of .31 and .38 between variable 109 and the variables of self-actualization and self-esteem, respectively.

On the average, Group 1 wives said they would not want their sons to have the same job as that of their husbands. The average response of Group 2 wives to the same question was that it would be all right for their sons to have the same job as that of their husbands under certain circumstances. One circumstance frequently mentioned was the interest or desire of the son. Two wives in Group 1 told the interviewers that they would not want their sons to do factory work. None of the Group 2 wives identified factory work as the kind of work that they would not like their sons to do. The• latter statements were in response to a question that preceded the one directly related to the attitude toward the job of the husband.

Group 2 wives mentioned a greater number of home characteristics that they believed would influence the husband on the job than did Group 1 wives. Of the sample of 40 wives, 16 stated that nothing would make a difference. Reasons given for this answer were that the atmosphere was totally different at work and that work was so much different from home. The remaining 24 wives listed ways in which they believed their home might influence their husbands' work on the job. Harmony in the home, a pleasant home, things going well and a cheerful attitude seemed important to several homemakers. If the husband were worried or nervous or had problems at home such as arguing, financial problems, illness or children not getting along, it might influence his work. Six said that a good breakfast, lunch and a hot meal waiting when he comes home were important. A well-organized, clean home was mentioned by five homemakers. Sleep and rest were mentioned by four. Another homemaker

Table 7. Means for psychological characteristics of the wife by criterion group

Variable	Group 1	Group 2	Possible range
Cluster of psychological characteristics			
54. Self-actualization[a]	2.30	3.00	1-5[b]
55. Self-esteem[a]	2.60	3.35	1-5[b]
56. Ability to verbalize[a]	.90	1.25	0-2[c]
57. Ability to understand questions[a]	.65	1.15	0-2[c]
59. Willingness to express ideas[a]	1.00	.95	0-2[d]
Additional psychological characteristics			
60. Attitude toward husband's job[e]	.25	.85	0-2[f]
108. Attitude toward women working	.40	.70	0-2[f]
109. Number of home characteristics that wife said would influence husband on the job	.70	1.15	Actual no.

[a] Judgments made by interviewers without knowledge of criterion group of family.

[b] Code: Range was from 1=low through 5=high. See Appendix for further explanation.

[c] Code: 0=poor, 1=average, 2=good.

[d] Code: 0=unresponsive, 1=average, 2=expressive.

[e] Based on response to question, "Would you like for your son to have the same job that your husband has now when he grows up?"

[f] Code: 0=no, 1=yes under certain conditions, 2=yes.

mentioned that it would help to listen to him when he talks about his work.

A number of the variables related to food, nutrition and health are reported as independent items. There were insufficient correlations among the items to form any clusters, but findings in relation to them and certain employment variables justified their inclusion in the report.

In the areas of food, nutrition and health, as reported in Table 8, the differences between the two groups vary according to the type of behaviors being examined. The mean dietary intakes for the two groups were similar. For both groups the husband's diets averaged good and those of the wives were poor. The score for the husband would be expected to be the more reliable of the two measures because it was based on a three-day record in contrast to the recall of food intake for a 24-hour period for the wife. The latter was judged adequate for a study of groups by the nutrition consultant to the project. The scores for dietary intake for husband and wife correlated negatively with the number of children at home. The wife's dietary intake correlated positively with housing and educational level of the wife. The dietary intake for the husband correlated positively with extent of structured planning for use of family resources.

Two measures of the wife's knowledge regarding food and nutrition, ability to make food substitutions and knowledge of food fallacies, had a positive correlation of .44. Knowledge of nutrients did not correlate significantly with the other two. The mean scores for the wives on knowledge of food and nutrition were higher for Group 2, and the same group of wives reported more written planning and use of information available when purchasing food.

The results related to health, as shown in Table 8, probably reflect a confounding of actual health status and sensitivity to deviations from optimum health. The wives of Group 2 identified a larger number of health problems in their families including problems of overweight.

The problem of overweight on the part of the wife correlated negatively with judgments of her sense of clothing adequacy, quality of her wardrobe and the social mobility of the family. Overweight on the part of the husband correlated positively with the educational level of the wife and social participation index of the family.

Means for the two criterion groups on individual items dealing with clothing behaviors are reported in Table 9. Additional clothing behaviors are reported as a part of the management of resources cluster. Group 2 means were higher than for Group 1 on status of the stores patronized in the purchase of family clothing, the type of clothing worn by the husband to work, the extent to which the husband selected his own clothes, the extent to which the husband was conscious of his own clothing and that of his wife, the interest of the wife in making changes in her personal clothing and the choice of the wife in buying one $14 dress rather than two $7 dresses.

The cluster of variables represented in Figure 5 is, with the exception of the weekly food budget, a combination of some of the ratings on behaviors related to management, relationships and

Table 8. Mean behaviors related to food, nutrition, and health by criterion group

Variable	Group 1	Group 2	Possible range
Score on record of dietary intake:			
83. 3-day record of husband	1.90	2.05	0-3[a]
84. 1-day record of wife	.55	.40	0-3[a]
Knowledge of wife regarding:			
78. Ability to make food substitutions	1.55	2.00	0-3[b]
79. Nutrients	3.15	3.45	0-10[b]
82. Food fallacies	7.45	9.75	0-18[c]
Purchase of food by wife:			
69. Extent of written planning	1.85	2.40	0-4[d]
70. Conscious use of advertising	4.05	4.50	0-8[e]
72. Use of information on food labels	1.60	2.05	0-4[f]
Health:			
80. Wife overweight	.30	.50	0-1[g]
81. Husband overweight	.15	.35	0-1[g]
85. Number of family health problems reported	.75	1.15	actual no.
86. One or more family members identified as lacking in energy	.45	.75	0-1[g]

[a] Code: 0=poor, 1=fair, 2=good, 3=excellent.

[b] Number of correct answers.

[c] Possible range of coded scores. See explanation in Appendix.

[d] Code: Sum of (1) list is written 2=always, 1=sometimes, and 0=never and (2) list includes 2=everything, 1=almost everything, and 0=few or no items.

[e] Code: Sum of responses to four items on use of advertising with each scored 2=almost always, 1=sometimes, 0=almost never.

[f] Code: Sum of responses to two items on use of food labels with each scored 2=almost always, 1=sometimes, 0=almost never.

[g] Code: 0=no, 1=yes.

clothing made by one or more judges after reviewing the interview data regarding each family. Although the correlations may be due in part to relationships among the behaviors and in part to halo effect, they are discussed as a cluster of variables and entitled management of resources. Management of resources was positively related to educational level of the wife and knowledge of nutrients.

Means for individual items as well as for the cluster on management of resources are reported in Table 10. In general the means for Group 2 were higher than those for Group 1 on the cluster, regularity of saving, and number of tasks performed by the husband

Table 9. Means for clothing behaviors by criterion group

Variable	Group 1	Group 2	Possible range
40. Status of stores patronized in purchasing family clothing	1.65	2.15	0-3[a]
Behaviors of husband			
98. Type of clothing worn to work	.10	.70	0-1[b]
97. Is clothes conscious - own clothes	1.40	1.80	0-2[c]
96. Is clothes conscious - wife's clothes	1.05	1.35	0-2[c]
Behaviors of wife			
101. Would make change in personal clothes	1.20	1.60	0-2[d]
102. Would buy $14 dress over two $7 dresses?	.65	1.10	0-2[e]
112. Sense of clothing adequacy	2.70	2.65	1-5[f]

[a] Code: Mean rating for stores was used with 0=none, 1=low-priced, 2=medium-priced, and 3=high-priced.

[b] Code: 0=jeans, 1=slacks.

[c] Code: 0=no, 1=some, 2=yes.

[d] Code: 0=none, 1=inability to verbalize, 2=some.

[e] Code: 0=$7 ones, 1=uncertain, 2=$14.

[f] Code: 1=dissatisfied to 5 = highly satisfied.

Variable		110	111	113	115	116	118	119	77
Degree of use of consumer information on clothing by wife	110								
Knowledge of textiles - wife	111	88							
Wardrode quality for wife	113	56	48						
Extent of harmony in family	115	59	50	42					
Extent of communication in family	116	57	60	42	78				
Extent of structured planning by family for use of money	118	61	60	59	54	55			
Knowledge of family finances - wife	119	40	47	47	41	51	80		
Weekly budget for food	77	40		48	47	54	62	62	

Figure 5. Correlation matrix for management of resources

Table 10. Means of selected management behaviors by criterion group

Variable	Group 1	Group 2	Possible range
Cluster on management of resources			
110. Degree of use of consumer information on clothing by wife	2.70	3.40	1-5[a]
111. Knowledge of textiles by wife	2.45	2.95	1-5[a]
113. Wardrobe quality for wife	2.80	2.80	1-5[b]
115. Extent of harmony in family	2.90	3.45	1-5[c]
116. Extent of communication in family	2.90	3.10	1-5[d]
118. Extent of structured planning by family for use of money	3.15	3.60	1-5[a]
77. Weekly budget for food	.60	.55	0-1[e]
Individual items			
105. Regularity of saving by family	1.25	1.65	0-2[f]
107. Number of tasks husband performed at home	2.55	2.95	0-6[g]
87. Religious leaders identified as source of help with family problems	.30	.55	0-1[e]
88. Relative or friend identified as source of help with family problems	.50	.35	0-1[e]
89. Professional person (physician, lawyer, school principal) identified as source of help with family problems	.35	.20	0-1[e]
90. Wife indicated family would go to no one for help with family problems.	.15	.25	0-1[e]

[a] Code: 1=none to 5=much.
[b] Code: 1=low to 5=high.
[c] Code: 1=intense conflict to 5=consistent harmony.
[d] Code: 1=uncommunicative to 5=highly communicative.
[e] Code: 0=no, 1=yes.
[f] Code: 0=none, 1=occasionally, 2=regularly.
[g] Code: actual number.

at home. The two groups do not differ greatly in terms of their use of resource people when the family has a problem. In the respective groups 15 and 25 percent of the homemakers said that they would go to no one when the family had a problem.

Three variables related to the husband's role in making family decisions or the extent to which the authority pattern appeared patriarchal and makes up a cluster shown in Figure 6. Additional data available from the interviews but not analyzed during the time period for this project may provide further clarification of the roles of the husbands and wives in the families of this study.

Behaviors categorized under family relationships are reported in Table 11. The wives of Group 1 scored their marriages as slightly happier on the Terman Marital Happiness scale than was true for Group 2. Questions relating to the validity of this measure are discussed in a later section. The families of the two groups did not differ much on the remaining variables; however, the means for Group 2 were in the direction of democratic decision-making rather than the husband's having a dominant role in the decision-making. Two items in the management cluster shown in Table 10, refer to family relationships. The Group 2 families exhibited slightly more harmony in the family and perhaps better communication.

Variable		100	104	117
Husband selects own clothes	100			
Husband decides regarding expenditures	104	36		
Extent patriarchal as to authority pattern	117	50	59	

Figure 6. Correlation matrix for extent patriarchal in authority pattern

Table 11. Mean behaviors concerning family relationships by criterion group

Variable	Group 1	Group 2	Possible range
48. Marital happiness scale	5.65	5.10	1-7[a]
Cluster on authority pattern			
100. Husband selects own clothes	1.45	2.00	0-3[b]
104. Extent to which husband makes decisions regarding expenditures[a]	1.25	1.05	0-2[c]
117. Extent patriarchal[b] (on continuum from matriarchal to democratic to patriarchal)	3.30	3.10	1-5[d]

[a] Code: 1=very unhappy to 7=perfectly happy.
[b] Code: Selected by 0=gifts, 1=wife alone, 2=husband and wife, 3=husband alone.
[c] Code: 0=wife, 1=both, 2=husband.
[d] Code: 1=matriarchal, 3=shared authority, 5=patriarchal.

The number of newspaper and magizine subscriptions for the family did not correlate significantly with each other or cluster with other variables. Number of magazines was more discriminating among the families than the former with the standard deviation for number of newspaper subscriptions being .91 and that for magazine subscriptions being 2.10 on the same scale. The number of newspapers taken correlated positively with knowledge of food and nutrition by the wife. Both the number of newspapers and of magazines correlated positively with some of the variables in management of resources, especially with knowledge and degree of use of consumer-related information. Number of newspapers was positively related to conscious use of advertising and negatively related to the extent to which the wife identified behaviors which would occur at work if her husband dressed differently from his fellow workers.

E. Relationships Between Employment and Home-Environment Variables

The relationships between the employment clusters and home environment clusters were studied by analyzing the intercorrelations between the variables in each of the clusters. The report also includes selected individual variables.

No relationships were apparent between the employment cluster, criterion group and any of the home environment clusters. Criterion group did, however, correlate positively with the following individual variables; age of father when first child was born, status of stores patronized, number of magazines to which the family subscribes, ability of the wife to understand questions from the cluster of psychological characteristics, attitude of the wife toward the husband's job, use of leisure time by husband to work on the house, number of suggestions for improvements in the house by the wife, knowledge of food fallacies by the wife, type of clothing worn by the husband to work, the husband's selection of his own clothes from the cluster on authority pattern, and the preference of the wife for a dress worth 14 dollars rather than two worth seven dollars.

Seniority correlated positively with the type of clothing worn by the husband to work, the variables regarding the wife's knowledge of food and nutrition, two psychological charateristics of the wife: self-actualization and ability to understand questions, attitude of the wife toward employment for women, preference of the wife for a dress worth 14 dollars, knowledge and use by the wife of clothing information for the consumers and harmony in the family from the management cluster, number of suggestions for improvements in the house, selection of his clothes by the husband from the cluster on authority pattern and number of newspapers to which family subscribed. Seniority correlated negatively with number of children in the family.

Relationships between mobility and home-environment variables are reported in terms of the correlations between the distance between the beginning wage group and the wage group at the time of this study. The number of successful bids upward appeared to correlate erratically with other variables. Based on the former variable, mobility correlated positively with number of newspapers and magazines, ability of wife to understand questions from the cluster of psychological characteristics, knowledge of food fallacies, type of clothing worn by the husband to work and preference of the wife for a dress worth 14 dollars. Mobility correlated negatively with number of children in the family.

Absenteeism correlated positively with number of children, number of moves by the family during the preceding five years, identification of one or more family members as lacking in energy and number of home characteristics that would influence the husband on the job as identified by the wife. Absenteeism correlated negatively with regularity of saving by the family. One type of absenteeism, absences due to illnesses, correlated negatively with the housing cluster, adequacy of money for clothing as reported by the wife and the cluster on management of resources. Absences due to illness correlated positively with the cluster on extent of patriarchal authority pattern.

Suggestions to the company correlated positively with number of magazines to which the family subscribed; three of the psychological characteristics of the wife, self-actualization, ability to verbalize and willingness to express ideas; number of suggestions wife had regarding improvements for the house; and extent of structured planning for use of resources in the family from the cluster on management. There was a negative correlation between suggestions to the company and the husband's commenting on the clothing of the wife.

Wages from the company correlated negatively with number of children. Home-environment variables with which wages correlated positively included house type, aesthetic qualities and furnishings in repair from the housing cluster; number of suggestions for house improvement; social participation index of the family; number of newspapers to which family subscribed; the psychological characteristics of self-actualization, ability to verbalize and to understand questions; the variables on knowledge of food and nutrition; preference of the wife for a dress worth 14 dollars over two worth seven dollars; and the cluster on management of resources.

Other employment is discussed in terms of its components. Income from sources other than the company correlated positively with education of the husband, house type and the score of the wife on dietary intake. Both income from other sources and extent of farming correlated positively with the social participation index of the wife and housing density, and negatively with knowledge of nutrients. Extent of farming correlated positively with the number of church-related organizations to which the family belonged and negatively with judged harmony in the family. Both extent of farming and number of part-time jobs correlated negatively with the husband's using leisure time to work on the house although income from other sources correlated positively with this latter variable.

F. Methods of Obtaining Information

The methods used in obtaining the data were effective for the purposes of the study. Observations regarding the methods are presented in the Discussion.

IV. DISCUSSION

A. Comparison of Sample with Others in Population

The differences between the two criterion groups on characteristics planned to be common for the groups appear attributable to differences in the employees in the two strata of the population and not due to sampling error. The differences between the two groups on the means shown in Table 1 as well as the differences in the number of employees in the two strata may be explained by a number of conditions. Seniority was a major consideration in determining opportunities for advancement including opportunities for apprenticeship training. This role of seniority may explain, in part, the differences between the ages of those employees in the lower wage groups at the time of the study and those in the upper wage groups including journeymen in skilled trade departments.

In this study, educational level of the employees when first hired was controlled by matching the two groups on this variable. The groups of employees were so similar in educational level that any differences between the groups on other characteristics were assumed not to be associated with this characteristic. At the time of the study the 12 men in wage group 11 had completed apprenticeship training. Three of the 12 had less than a high school education and would not be eligible for apprenticeship training if they were applying under current standards.

B. Family Descriptions

The differences in average ages of the employees and their wives in the two criterion groups as shown in Table 2 presented a confounding element in analyzing variables related to employment and to home environment. Data relating to child development and family relationships have not been completely analyzed, but the interviewers tentatively concluded that the presence of older children in the families probably increased the complexity of problems that the families were aware they were facing. For example, the interviewers observed that some families with children of pre-school age had used little or no money resources for clothing for the wife and children, but families with daughters and sons in high school indicated that clothing was often of major importance to these youths; and although amounts were not known, more money was being used for clothing for these boys and girls. In the area of communication between children and parents and the severity of the problems recognized by parents in guiding their children, more problems were reported in relation to older children than for younger children.

Group 2 employees were older when their first child was born than were those in Group 1. This difference may be associated with the dates of the Korean conflict.

As shown in Table 2, Group 2 wives had a higher level of education than those in Group 1 although the educational levels of the husbands were comparable. Educational level of the wife appeared to be associated with identification of the husband in the upper wage groups.

Although the number of children in the families of the two groups was similar, the proportions of children in the different age groups varied. Very few of the families had children who were no longer at home.

C. Employment Variables

The two criterion groups differed from each other on mean wage group at the time of the study by eight wage groups as shown in Table 3. In Group 2, there were 12 journeymen in skilled trades and eight men in leadership jobs in wage groups lower than those for skilled trades. The men in Group 1 did not have leadership jobs.

The men in Group 2 had more seniority than those in Group 1 as shown in Table 3. This variable alone, however, does not explain the differences between the two groups on mobility.

The measure of mobility across wage groups was a crude measure but was assumed to be valid. Although no one employee would necessarily move through all wage groups (some wage groups include only limited types of work.), each wage group represents a higher level of wage than the preceding one. The difference between the two groups on the first measure of mobility in Table 3 was 5.45 wage groups. The company gives employees priority over non-employees in filling any vacancies. That the company has hired new employees for wage groups higher than those held by Group 1 indicates that the men in Group 1 have not chosen to bid for some jobs in higher wage groups.

The number of successful bids upward appears to be less comparable for all men in the study. Employees could bid on jobs available but the number of vacancies and therefore the number of opportunities for bidding varied from department to department. Some of the men in the study had a number of successful bids upward, but were still in the wage group in which they started. This was possible because of involuntary downgrading associated with reductions in the work force or voluntary downgrading. This measure would probably be even less comparable among different companies than was true in this study of employees of one company.

Hours of absence differentiated between the two criterion groups, but number of absences did not. The difference was not in the direction anticipated. Further inspection of the data regarding absences due to illness revealed that nine of the men in Group 1 and six of the men in Group 2 were absent due to illness. No explanation was found in this study for the results on absences. One of the six men in Group 2 was absent 85.9 hours due to illness. This was over twice as many hours as any other employee.

The cooperating company had a system of recording the number of suggestions submitted by each employee and paying the employee for suggestions that resulted in company savings. The amount paid the employee or group of employees for the suggestion was in proportion to the amount saved by the company in a given time up to a certain maximum amount. This variable discriminated between the two groups of employees, although the judgment sampling would account for some of the difference.

Although the two criterion groups of employees differed greatly on wage group at the time of the study, the differences between the two groups in terms of annual wages from the company were less marked as shown in Tables 3 and 4. The aim of identifying two employee groups who differed in major ways in their employment records was not achieved to the extent hoped. Annual wages of the two groups of employees would be described as similar rather than contrasting. There are several possible explanations for this. The men in Group 1 were in jobs that provided eligibility for incentive rates or straight hourly rates. On incentive rates the employee earned on the basis of production of acceptable products, and fast, efficient, accurate worker could earn more on incentive rates than on straight hourly rates. The men in Group 2 were in jobs that did not provide incentive rates although the regular hourly rates were higher in the upper wage groups than in the lower wage groups. Some of the men in the upper wage groups, however, were in jobs for which they received an additional pay because of leadership functions that they performed.

Wages were also affected by the shift that the man worked. The hourly wage for the afternoon shift was a number of cents higher than for the day shift; likewise, the night shift that began around midnight had an even higher hourly wage. Some workers worked rotating shifts; others consistently worked on the same shift throughout the year.

Because the reporting of wages appeared to be a sensitive matter, the categories of wages from the company were set up so that each category included a spread of $1500. Perhaps in future studies a spread of $1000 would be adequate to both free the employee to respond and provide for increased discrimination among wage levels.

Proportionately the difference between the two groups on income from sources other than the company was the same as that for annual wages as shown in Table 3. Seven of the 40 men were farming. For some of these seven families the owning and operation of a farm appeared a major goal.

Employment variables that produced fruitful results and that could be considered in further studies included wage group at the time of the study, mobility across wage groups, annual wages from the company, number of suggestions submitted to company, hours absent, extent of farming and income from sources other than the company.

D. Home Environment Variables

For both the social participation index of the family and of the wife the scores for Group 2 families represented the entire possible range. For the same variables the range for Group 1 was from 0 to 12 for the family and 0 to 16 for the wife.

That all the men had been employed by the company for 10 to 13 years indicated that any geographic mobility of the family had been limited to a relatively small geographical area. Any lack of social participation was probably not because of newness to the community. A random sample of employees would probably vary much more in terms of geographical mobility than was true for this sample.

Like many of the measures used in this study, the criteria for judging most of the characteristics of housing need further refinement. For those cases in which the independent judgments of the two interviewers regarding house type and neighborhood differed by more than one category, the principal investigator and interviewers made a return trip to the neighborhoods, observed the houses from the outside, discussed the criteria and observation and came to a common agreement as to the score. It was not possible to follow the same procedure, of course, regarding characteristics of the inside of the house. In general, the independent judgments of the interviewers were similar or the same. The mean of the two judgments was used.

Although the differences between the two groups on the housing variables were minor, the wives of Group 2 believed that their houses, which were slightly superior to the houses of Group 1, met the needs of the family less well. The response on the latter variable is consistent with the responses on the number of suggestions for house improvement.

The measures of psychological characteristics shown in Table 7 were admittedly crude. The criteria used are explained in the Appendix. The scores for the women in each of the two groups included the complete range for self-actualization, self-esteem, ability to understand questions, and willingness to express ideas.

A question can be raised as to whether the diets of women were as poor as the dietary scores intake would indicate. The interviewers recorded the dietary intake at the time of the interview by asking questions of the wife in regard to her food consumption for the preceding 24 hours. It is possible that some snacks or tastes of food at irregular times were not recalled or were not considered as a part of the dietary intake. The interviewers, however, attempted to phrase questions in such a way that such foods would be recalled and included. The 24-hour period never coincided exactly with that of a complete day; that is, it always included part of the meals from two different days. The researchers question that this affected the quality of the diets recorded, however, since there was little or no indication that the wives planned the meals for a day in relation to any particular nutritional guide. Most of the wives diets were low in most of the food categories considered in the scoring method. The diets of many of the men were also low in a number of the food categories.

All three scores relating to knowledge of food and nutrition were based on responses to a group of items. In each instance, the items really comprised a test. The test on food fallacies was the only one in which the degree-of-certainty method of scoring that is explained in the Appendix was used. The scores indicated a further need for knowledge related to food and nutrition, and the diets indicated a need for applying the knowledge that was known.

The status of the stores from which the family clothing was purchased varied. The actual stores named by the women were rated on general categories of quality and cost of merchandise by the interviewers.

The type of clothing worn to work was one of the variables that varied most consistently with criteria groups in the direction anticipated. The two types of clothing were jeans and T-shirts worn mostly by Group 1 and slacks and sport shirts or matching sets of work shirts and pants worn mostly by Group 2.

The question relating to the $14 or two $7 dresses functioned effectively in differentiating between the two criterion groups. Some of the women who chose the $7 dresses indicated that they did not go very many places other than home, that the greater quantity would be appreciated and that the quality would be satisfactory for around the house. The difference in income between the two groups may have provided the additional margin for clothing.

The response to the question concerning to whom the family would go in case of family problems indicated that these families were not accustomed to using a wide variety of community resources in helping to solve any family problems that arose. There may be some question as to the meaning that they gave to the word, problem.

The number of tasks performed by the husband at home was arbitrarily reported in Table 10 in terms of its relationship to management of human resources. Some of the tasks included care of the lawn and house as well as tasks performed within the house.

The researchers had questions regarding the validity of the Terman marital happiness scale in terms of the responses received from the wives in this study. Although it would not be possible to draw definite conclusions on the basis of the present study, the responses on the marital happiness scale appeared, in some instances, inconsistent with other information provided by the homemaker.

The variable in Table 11 entitled extent patriarchal in authority pattern involved the extent to which authority was placed in one individual or was shared by both husband and wife and the extent to which the husband or the wife appeared to be playing the dominant role in making decisions. Since the two aspects were combined in one continuum, the democratic, shared authority pattern is the middle value on the scale. Thus, the findings in Table 11 indicate more shared responsibility in Group 2 than in Group 1.

E. Relationships between Employment and Home-Environment Variables

The relationships between criterion group and home-environment variable were analyzed by the comparison of group means and the inspection of correlations between criterion group and other individual variables or clusters. Although criterion group correlated significantly with relatively few individual variables, three-fourths of the group means for Group 2 were in the direction expected and many of the others were approximately the same for the two groups, this indicated that more relationships could be expected if the individual measures are refined, scores are obtained for clusters of items related to home environment rather than for individual items and greater differences in employment criteria are obtained in the sample. The individual items with which criterion group correlated appeared to reflect social status, increased reading of magazines, a positive attitude toward the husband's job, shared responsibility for maintaining and improving the house, more knowledge about certain aspects of homemaking by the wife, a preference for higher quality of material goods and a choice of clothing by the husband consistent with his level of work.

Seniority correlated positively with a number of the home environment variables. Although type of clothing worn by the husband to work related to seniority as well as to several other employment variables, the data from the present study are inadequate for explaining whether the type of clothing worn depends on what is worn by the other workers in similar positions or whether the type of clothing worn played a role in advancement to higher level positions. It is possible that clothing, as a symbol of self-image, reflected the image that the individual wished to convey to himself and to other workers.

The other variables with which seniority correlated appeared to describe a home in which the homemaker was knowledgeable regarding food and nutrition and information needed by the consumer; was able to understand questions and alert to ways of making improvements in the home; was self-actualizing and accepted employment for women; desired material goods of high quality; was able to establish and maintain harmony in the family; and had a husband who assumed such individual responsibility as selecting his own clothes.

Mobility across wage groups correlated with variables similar to those for seniority. Again the picture was of a knowledgeable wife, a family who subscribed to a number of newspapers and magazines, a husband who wore the type of clothing expected on the job and a wife who preferred material goods of high quality.

There may be a number of explanations for the positive correlation between absenteeism and number of children. Further analysis of the types of absences in this respect may be helpful. Whether the increased absences were associated with illnesses of the children, need for caring for the children for other reasons, or taking the children to various activities is not known. The relationship between hours of absences and number of characteristics of the home that the wife believed would influence the husband on the job may indicate that some of the absences have been because of problems or incidences associated with the home. This is not known from the present data. The negative correlation between absences and regularity of saving may be explained by a family's ability to predict future events and plan ahead to meet them satisfactorily without unnecessary penalties.

The more adequate the housing, the higher the scores on management of family resources, and the greater the extent of sharing of responsibility by the wife and husband, the fewer the absences due to illness tended to be. Such a relationship may be reflecting an improvement of general welfare of the family that may be associated with the ability of the wife to define her responsibilities as a co-manager of the family and, in many respects, be the major manager of many of the homemaking responsibilities.

Number of suggestions to the company correlated with variables that relate to openness of communication of ideas, alertness to ways of improving existing conditions in the home and extent of planning ahead to achieve goals.

An additional aspect of home environment with which wages from the company correlated included the social participation index of the family. Other variables appeared to be describing some of the same home characteristics that related to the other employment variables.

The results in relation to other employment need to be interpreted in the light of the fact that less than one-half of the employees earned over $100 from sources other than the company. One possible explanation for the positive relationship between education of the husband and income from other sources is that the higher level of education qualified the man seeking part-time employment for higher levels of part-time jobs just the same as it qualified him for higher levels of full-time jobs. Another possible explanation is that the characteristics which contributed to his achieving higher education also contributed to his being able to locate more remunerative part-time jobs and to manage his resources to earn more from part-time jobs, possibly by working a greater share of the time.

In the husband's questionnaire, he was asked to check the category of income from the company and from other sources that most accurately described his income. The intent was that he report the income that he earned. It is possible, however; that the request could have been interpreted to mean family income and in some instances where the wife worked part-time, some of her income may have been included. The instructions to the husband in further studies need to be clarified.

The relationship between extent of farming and the social participation index of the wife may be explained in part by the number of church-related organizations in which the wives participated. This suggests that farming is associated with rural values including active participation in religion.

There was a negative relationship between number of part-time jobs as well as extent of farming with the husband's working on the house during his leisure time. Part of the lack of working on the house is undoubtedly associated with lack of leisure time.

F. Methods of Obtaining Information

Obtaining the data by interviews proved successful in providing an opportunity for the interviewers to obtain information beyond that included in the interview schedule, pursue prospective leads for more complete knowledge and observe the homemaker interacting with other family members within her own home. It was possible to establish rapport with the homemakers, and this was probably an important contributor to obtaining cooperation in such a comprehensive and time-consuming study and in obtaining data of a personal nature.

The presence of two interviewers during each interview appeared justified from two standpoints. First, in half of the homes the second interviewer was needed to supervise the children's play or to assist with household tasks to free the homemaker for the interview or was needed to talk with the husband to provide privacy for the interviewee. Second, this procedure also served as a check for reliability between interviewers of judgments made.

The homemakers were not knowledgeable about some of the needed information concerning their husbands. In future studies, it would be helpful if information concerning opinions, attitudes, behaviors and family background of the husband could be obtained directly from the husband. Assuming the company data were correct, the wives made 16 errors in age and educational level of their husbands.

Conducting a study with a cooperating company provided reliable employment data for those employees in the sample. If a study were conducted of men sampled from the general population, the reliability of employment data given by the men themselves would be subject to human errors, such as central tendency, those associated with recall and freedom to provide accurate information.

V. CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

The sections of this chapter are organized around the three objectives of this study with conclusions, implications and recommendations presented in relation to each objective. All conclusions are tentative and are intended to serve as a basis for further study.

A. First Objective

A number of characteristics of the home environment of skilled, semi-skilled and unskilled workers appear related to the employment record of the husband. Based on the intercorrelations among variables, clusters of characteristics of home environment and employment were tentatively identified. Further studies should include the formation of clusters of related variables after data are obtained from a sample larger than the one in the present study.

Characteristics of the home environment that appeared positively related to the interrelated employment variables, criterion group or wage group at time of the study, mobility, wages, and seniority, were psychological characteristics of the wife, number of suggestions for house improvement, type of clothing worn by the man to work, preference of the wife for a 14 dollar dress over two seven dollar dresses and knowledge of food and nutrition on the part of the wife. Knowledge of textiles and clothing by the wife was positively related to seniority; attitude of the wife toward the job of the husband, to wage group; extent to which the husband selected his own clothing, to wage group and seniority; and management of resources, to wages. The housing cluster, quality of the wife's wardrobe and social participation index of the family were positively related to wages, income from other sources, and, in the case of social participation, to extent of farming. Criterion Group 2 had higher means than Group 1 on three-fourths of the home-environment variables.

Three of the home-environment variables correlated positively with suggestions to the company. These included management of resources, psychological characteristics of the wife and number of suggestions for house improvement.

Number of children in the family and geographic mobility of the family correlated positively, and regularity of saving by the family correlated negatively with absenteeism. Absences due to illness correlated negatively with the housing cluster and management of resources and positively with extent to which the family was patriarchal in authority pattern.

Additional relationships are anticipated between characteristics related to family relationships and child development and employment variables when these data are analyzed further. Recommendations regarding including these aspects of home environment in further studies will be based on the findings.

It is recommended that the relationships identified in this study be investigated further in a survey of employees in industrial, distributive and service jobs for which vocational and technical education provide training. A number of the measures of the variables need refining to provide for increased reliability.

B. Second Objective

The method of defining a population and sampling employees of a cooperating company was efficient in terms of locating employees and their homes, obtaining reliable and valid data regarding employment, and gaining the cooperation of the interviewees. It is recommended that a similar procedure be used in studying employees of a number of firms.

Conducting interviews using interviewer pairs is recommended for a survey designed to follow up this exploratory study. The role of a second interviewer in freeing the homemaker for a two-hour period, especially when there were pre-school children to be supervised, facilitated the interviewing. It is recommended that the husbands as well as the wives be interviewed. In this case a pair of interviewers could be used exclusively for the interviewing of the husband and wife separately. Extra time would probably need to be allowed for such interruptions as those associated with the supervision of children's play. If the interviews needed to be conducted when all children were home, privacy for the interviews would probably be difficult to obtain in some homes.

C. Third Objective

A tentative model for studying relationships between home environment and employment as a basis for making recommendations for vocational and technical education programs is shown in Figure 7. This model is an adaptation of one part of an exploratory model for analyzing vocational and technical education being developed by the Strategic Intelligence Unit of the research and development effort of which this study is a part. The portions of the model are only partially completed.

The model portrays family units, composed of a nuclear family similar in composition to those in this study, as one type of human resource. The family has been considered a social unit and an economic unit from the standpoint of consumption and is proposed that the family unit plays an additional role in the economic world.

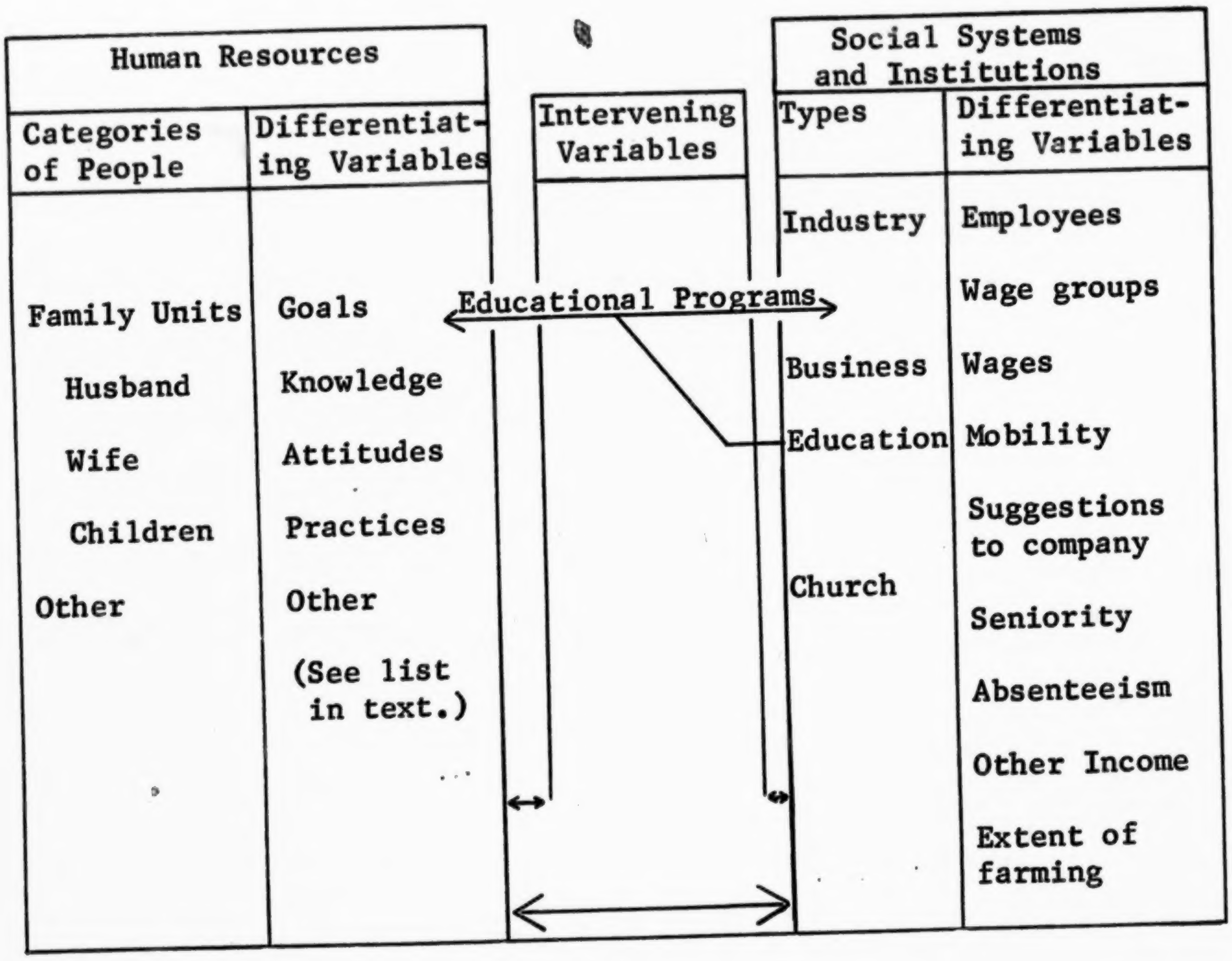
Human Resources
Categories of People
Differentiating Variables
Intervening Variables
Social Systems and Institutions
Types
Differentiating Variables
Family Units
Husband
Wife
Children
Other
Goals
Knowledge
Attitudes
Practices
Other
(See list in text.)
Educational Programs
Industry
Business
Education
Church
Employees
Wage groups
Wages
Mobility
Suggestions to company
Seniority
Absenteeism
Other Income
Extent of farming

Figure 7. Tentative model for studying relationships between home environment and employment.

Each employed family member affects and is affected by the family, and the family modifies its members not only in the home but on the job.

In Figure 7, the column of differentiating variables under human resources represents the fact that families and members of families differ on a number of characteristics, which are subject to change associated with many factors within and outside of the home. Some of the differentiating variables for family units include economic, social, vocational, educational, housing, and health goals and aspirations; knowledge related to homemaking or other aspects of life; health as reflected in diet or sleep, quality of housing; attitudes toward jobs or toward themselves as people; social participation; management of resources; geographic mobility; interaction within the family including communication, authority patterns and cohesiveness; clothing behaviors; composition of the family, including ages and number; psychological characteristics of family members; educational level of members; and abilities related to employment.

The model lists a few examples of social systems and institutions. The differentiating variables included refer to characteristics on which individual employees as well as groups of employees associated with various industries or businesses would differ.

It is proposed that identification of relationships between the differentiating variables of family units and those of employees would be useful to vocational education. Such knowledge is needed by education in attempting to provide intervening variables that would facilitate behavioral changes beneficial to the family units and to business and industry.

A null hypothesis proposed for further testing is that no correlation exists between wife's educational level and measures of achievement of the husband in the work world. If findings justify rejection of this hypothesis, such a relationship could be explained in part by the relationship between general education and ability to learn to make improvements in home environment. A further null hypothesis is that if education focused on improved home and family living is linked with higher levels of the wife's general education, measures of home environment will not only show improvement, but the relationship between the education of the wife and measures of achievement of the husband in the work world will be stronger. These two hypotheses can be tested in the survey being proposed as an immediate follow-up of this exploratory study.

The following null hypotheses are also proposed for testing. There is no relationship between a cluster of employment variables including wage group, mobility, wages and seniority and the following differentiating variables for family units: psychological characteristics of the wife, aspirations of the family relating to housing and clothing, type of clothing worn by the employee, knowledge of aspects of homemaking, attitude of the wife toward the job of the husband, quality of housing, quality of clothing, social participation index of the family, management of resources and dietary intakes of the husband and wife. There is no relationship between suggestions to the company and educational level of the husband and wife, management of resources and psychological characteristics of the wife. There is no relationship between absenteeism and number of children, quality of housing, geographic mobility and roles assumed by family members.

VI. SUMMARY

A. Problem

There is evidence supporting the need for investigating the relationships between home environment and employment criteria for the husband. Few studies have explored this concept to date.

B. Objectives

The objectives of the present study were:

1. To identify some characteristics and possibly patterns of characteristics of the home environment of skilled, semi skilled, and unskilled workers which appear to be related to the employment record of the husband.

2. To test various methods of obtaining information.

3. To develop a rationale consistent with the findings and including hypotheses to be tested later in a more comprehensive study of relationships between employment and home environment.

C. Method

The population chosen was skilled, semi-skilled and unskilled workers who met the criteria for the study being conducted. Criteria for selection were: 1) married man with wife living at home and employed outside the home less than 20 hours per week, 2) family of one or more children under the age of 18 living at home, 3) man initially employed by the company between 1951 and 1955 and continously employed since that time, and 4) man had attained a minimum of an eighth grade education.

A sample of 40 employees of a midwestern manufacturing firm in a non-metropolitan area was selected. The employees were divided into two groups based on the wage group at the time of the study. Judgment sampling was used in an attempt to keep the educational level of the two groups equal and the group employment variables as different as possible.

Employment variables selected included wage group at the time of the study; number of successful bids upward and mobility across wage groups; income received from the company, from other sources and total income; number of absences, hours absent and absence due to illness; accidents; and number of suggestions to the company.

Home environment categories of variables included: clothing behaviors, housing, social characteristics, child development and family relationships, food and nutrition, management of resources and health.

The data were collected from three sources: the company, the homemaker and a questionnaire filled out by the husband. Two home economists with training in interviewing techniques collected the data.

A letter from the company and union officials notified selected employees prior to the beginning of the interviews. The interviewers went in pairs to the selected homes during the period beginning May 4 and ending June 14, 1966.

Three methods of analyzing the data were used: development and analysis of case studies, a comparison of the two criterion groups based on the means of variables for the two groups and an examination of intercorrelations among 116 variables within each of the criterion groups and for the total of 40 families.

D. Results

The employment variables included criterion group, seniority, mobility, absenteeism, suggestions to the company, wages and other employment. The means for Group 2 were higher on upward mobility, annual wages and number of suggestions submitted to the company. Number of absences and part-time jobs were similar for Groups 1 and 2, and seniority for the men in Group 2 was somewhat higher.

Home-environment variables included social participation of the family, housing, psychological characteristics of the wife, food, nutrition and health, clothing, management of resources, and family relationships and authority patterns. The measures of social participation, housing, psychological characteristics of the wife and management of resources appeared positively related to each other. Criterion Group 2 had higher means than Group 1 on three-fourths of the home-environment variables.

The employment variables of criterion group or wage group at the time of the study, mobility, wages, and seniority were positively related to psychological characteristics of the wife, number of suggestions for house improvement, type of clothing worn by the man to work, preference of the wife for a 14 dollar dress over two seven dollar dresses, and knowledge of food and nutrition on the part of the wife. One or more of the above employment variables was positively related to knowledge of textiles and clothing by the wife, attitude of the wife toward the job of the husband, extent to which the husband selected his own clothing, management of resources, housing, quality of the wardrobe of the wife and social participation index of the family.

Suggestions to the company correlated positively with management of resources, psychological characteristics of the wife and number of suggestions for house improvement. Number of children in the family and geographic mobility of the family correlated negatively with absenteeism. Absences due to illness correlated negatively with the housing cluster and management of resources and positively with extent patriarchal in authority pattern.

The method of defining a population and sampling employees of a cooperating company was efficient. Conducting interviews using a pair of interviewers proved to be advantageous.

E. Recommendations

It is recommended that the relationships identified in this study be investigated further in a survey of employees in industrial, distributive and service kinds of jobs for which vocational and technical education provide training. A number of the measures of the variables need to be refined in order to provide for increased reliability.

It is recommended that the methods used in defining a population and in conducting the interviews be used in a follow-up survey. Consideration should be given to interviewing the husband as well as the wife.

A tentative model for study of relationships between home environment and employment is proposed. Hypotheses for further testing are suggested.

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VIII. APPENDIX

A. Coding Plan

Variable No. Explanation of Variables Reported

1. The group number was defined as follows: The upper criterion group was Group 2, consisting of men in wage groups 7,8,9, 10, and 11 at the time of the study, and the lower criterion group was Group 1, consisting of men in wage groups 1, 2, and 3 at the time of the study. There were 11 wage groups and they were coded so that 1 represented the lowest and 11 the highest wage group.

2. Beginning wage group was the wage group in which the man began work for the company

3. Wage group at the time of the study is explained under variable one.

4. Mobility distance was the distance across wage groups that a man had moved. It was the number of wage groups between where he started and where he was at the time of the study. The possible range was 0-10.

5. Number of successful bids upward was the number of bids for advancement the man made and was awarded. A man had the opportunity to bid for a new job in which there was a vacancy. A successful bid meant he obtained the job; however, involuntary downgrading might later have moved him back to his previous job or lower. Also, a man could ask to be downgraded to a less difficult job. Thus, a man might have made several successful bids upward and still not necessarily be in a higher wage group than when he began.

6. Company income was divided into six categories and coded in the following manner:

   1 - under $3,999
   2 - $4,000 - $5,499
   3 - $5,500 - $6,999
   4 - $7,000 - $8,499
   5 - $8,500 - $9,999
   6 - over $10,000

7. Other income was divided into six categories and coded in the following manner:

   1 - none or less than $100

Variable No.

2 - $100 - $999
3 - $1,000 - $1,999
4 - $2,000 - $2,999
5 - $3,000 - $3,999
6 - over $4,000

8. Number of absences was coded as actual number of absences during 1965.

9. Total hours absent was coded as actual hours absent during 1965.

10. Absence due to illness was coded as actual hours absent because of illness in 1965.

11. Number of suggestions was coded as actual number of suggestions made to the company since date of hire. This included both those for which the employee received remuneration and those for which he did not.

12. Actual age of the husband was coded in years.

13. Actual age of the wife was coded in years.

14. Actual number of pre-school children was coded.

15. Actual number of elementary school children was coded.

16. Actual number of high school children was coded.

18. Actual number of children at home was coded.

20. Actual total number of children was coded.

21. Actual age of husband when the first child was born was coded in years.

22. Actual age of wife when the first child was born was coded in years.

23. Educational level of husband was recorded as years of school completed and ranged from 8 to 12.

24. Educational level of wife was recorded as years of school completed and ranged from 8 to 15.

25. Actual number of part-time jobs held by the husband was coded with the range from 0-3.

Variable No.

26. Extent of farming was coded as follows: 0=none, 1=15 acres or livestock, 2=109 or 150 acres, 3=240 or 360 acres.

27. A definition of house type developed by Warner (21, p. 149-150) was revised and coded as follows:

Score	Type
7	Excellent house: large, single family dwelling. good repair, landscaped, element of ostentation, interiors expensively finished.
6	Very good house: not quite as large as the previous. Still larger than utility demands. Less pretentious.
5	Good house: only slightly larger than utility demands. More conventional than the previous two.
4	Average house: well kept, conventional, mowed lawns, interiors appropriately furnished, aesthetics pleasing, essential furnishings present and in good condition.
3	Fair house: smaller, rectangular frame house, small lawn. Furnishings not expensive, but not deteriorated. May slightly need paint.
2	Poor house: category determined more by condition than size. Badly run-down but could be repaired. Interiors and exteriors need repair and are aesthetically unattractive. Not usually neat and clean.
1	Very poor house: has deteriorated so far that it cannot be repaired. Considered unhealthy and unsafe. May be a building not originally intended for dwelling. Halls and yards littered with junk. May have extremely bad odor. Frequently little furniture and in poor repair. Cleanliness and neatness at low level.

28. Evaluation of neighborhood was based on a scale developed by Warner (21, p. 123) for urban locations with direction of scoring reversed.

Score	Type
7	Very high: estate, very prestigious localities

Variable No.

6 High: the better suburbs and apartment house areas. Houses with spacious yards.

5 Above average: areas all residential, larger than average space around houses. Houses in good condition.

4 Average: residential areas. No deterioration in area.

3 Below average: not quite holding its own, business entering.

2 Low: considerable deterioration, run-down.

1 Very low: slum

Farm homes: surrounding buildings and farm were rated comparable to the above system.

29. Housing density was the number of persons per room. The scores ranged from 0.7 - 3.6.

30. Number of moves was actual number of house moves in the last five years.

31. Number of organizations of the entire family was the sum of organizations in which the husband, wife and children participated.

32. Social participation index of the wife was scored by weighting extent of participation in the following manner:

Number of organizations always attended ___X3 =____ .

Number of organizations sometimes attended____X2 =____.

Number of organizations never attended___ X1 =____.

Total offices held____X3 =____.

Social participation index Total____.

33. The social participation index of the family was calculated in the same manner as the preceding variable for each family member over six years of age and an average of the indexes was used.

Variable No.

34. House cleanliness was coded 0=poor, 1=medium, 2=good. This was a judgment made by the interviewers.

35. House orderliness was coded and judged as 34.

37. Aesthetic quality of the house was coded and judged as 34.

38. Whether furnishings were in repair was coded and judged as 34.

39. Presence of essential furnishings was coded and judged as 34.

40. To determine status of stores patronized all of the stores that the family patronized were listed, then categorized and coded as follows: 0=none, 1=low priced, 2=medium priced, 3=high priced. The mean score of stores patronized was used.

46. Number of newspapers to which the family subscribed was recorded as actual number.

47. Number of magazines to which the family subscribed was recorded as the actual number.

48. To measure marital happiness homemakers were asked to check on a seven point scale similar to that developed by Terman the degree of happiness of their present marriage. The scale is reported in Locke (15, p. 65).

1	2	3	4	5	6	7
.	.	.	.	.	.	.
very unhappy			happy			perfectly happy

50. The item "Does house meet your needs better now than when you moved in?" was coded 0=no, 1=yes.

51. The item "Do you have any difficulty in getting the improvements you need made?" was coded 0=no, 1=yes.

54. Self-actualization was rated by the interviewers on a scale from 1 (low) through 5 (high). The self-actualizing person was defined as more fully functioning and living a more enriched life than the average person, as active, motivated, confident, independent, social, content, and tolerant.

Variable No.

Non-self-actualizing persons were defined as rigid, frustrated, anxious, insecure, self-pitying and immature.

55. Self-esteem was rated by the interviewers on a scale from 1 (low) through 5 (high). Self-esteem was defined as the degree of adequacy or self-worth felt by an individual.

56. Ability to verbalize was rated by interviewers as 0=poor, 1=average, 2=good.

57. Ability to understand questions was scroed the same as 56.

59. Willingness to express ideas was rated by interviewers as 0=unresponsive, 1=average, 2=expressive.

60. The item "Would you like for your son to have the same job that your husband has now when he grows up?" was coded 0=no, 1=yes under certain conditions, 2=yes.

61. Number of organizations with a church focus was coded 0=none up to the actual number of activities listed by the wife for the family.

62. Number of organizations with a community focus was coded 0-none up to the actual number of activities listed by the wife for the family.

63. Number of organizations with an entertainment focus was coded 0=none up to the actual number of activities listed by the wife for the family.

64. Number of organizations with a focus on youth and socialization was coded 0=none up to the actual number of activities listed by the wife for the children.

65. The leisure time the husband spent working on the house was coded 0=none, 1=some.

66. Whether the husband spent leisure time in recreation was coded 0=none, 1=some.

67. The item "What specific things would you insist on having in a different house?" was coded 0=nothing up to the actual number of suggestions.

68. Number of years employed by the company was figured to the nearest whole number from date of employment to May 1, 1966 and the actual number was recorded.

Variable No.

69. Extent of written planning for food purchasing was determined by summing (a) whether a written list was made with 0=never, 1=sometimes, or 2=always, and (b) what the list included with 0=few items, 1=almost everything, or 2=everything. Scores were from 0-4.

70. Conscious use of advertising for food was a sum of the reponses on four items scored with a possible 0=almost never, 1=sometimes, and 2=almost always. The four items referred to whether the wife checked newspaper advertisements, whether she used the information, whether she listened to advertisements on radio or TV, and whether this affected her choice of foods. Range was from 0-8.

72. Use of information on food labels was a sum of responses to two items regarding whether the wife read labels for weight before buying and whether the information affected her choice. Range was from 0-4. Scoring for items was same as preceding variable.

77. Whether the family had a weekly budget for food was scored 0=no, 1=yes.

78. The wife's ability to make food substitutions concerning meat, milk and orange juice was scored 0=none correct to 3=all three items correct.

79. The wife's knowledge of nutrients contained in five foods was obtained by asking her to select from a list, the nutrient or nutrients that were found in important amounts in these foods. A perfect score was 10.

80. Whether the wife was overweight was coded 0=no, 1=yes.

81. Overweight on the part of the husband was coded the same as 80.

82. To obtain a food fallacies score homemakers were asked to agree or disagree with statements of common misconceptions about food and then to state their degree of certainty about each response. Responses were scored from -8 to +8 for each of 11 items and converted for purposes of coding to two-digit, positive scores using the formula,

$$\frac{\text{Degree of certainty score} + 88}{10}.$$

83. The record of dietary intake for the husband was a record of food and beverages consumed over a three-day period.

Variable No.

The record was analyzed by nutrition specialists and coded 0=poor, 1=fair, 2=good and 3=excellent.

84. The record of dietary intake of the wife was based on recall of food and beverages for the previous twenty-four hours by the wife. This record was analyzed by nutrition specialists and coded 0=poor, 1=fair, 2=good and 3=excellent.

85. To code health problems of the family actual number of problems listed was recorded.

86. Whether or not one or more family members was lacking in energy was coded 0=no, 1=yes.

87. Whether religious personnel would be consulted when the family had probems was coded 0=no, 1=yes.

88. Whether a relative or friend would be consulted when the family had problems was coded 0=no, 1=yes.

89. Whether a professional person such as a physician, school principal, lawyer, banker, staff of mental health center would be consulted when the family had problems was coded 0=no, 1=yes.

90. Wife indicated that family would consult no one when family had problem. This was coded 0=no, 1=yes.

96. Whether the husband was clothes-conscious in regard to what the wife wore was coded 0-no, 1=some, 2=yes.

97. Whether the husband was clothes-conscious about his own clothes was coded 0-no, 1=some, 2=yes.

98. What the husband wore to work was coded 0=jeans, 1=slacks.

100. Extent to which the husband selected his clothes was coded 0=gifts, 1=wife alone, 2=husband and wife together, 3=husband alone.

101. The item "if you could make any changes in the kind of clothes you have, what would they be?" was coded 0=none, 1=inability to verbalize, and 2=some.

102. The item "If you had $14 to spend on a dress, would you rather buy one $14 or two $7 ones?" was coded 0=$7.00, 1=uncertain, 2=$14.

Variable No.

104. The item "Who decides how the money should be used in the family?" was coded 0=wife, 1=both, 2=husband.

105. Responses to the item "If you manage to save money, how do you do it?" were summarized and coded as to regularity of savings with 0=none, 1= occasionally, 2= regularly.

107. On the item "Which of the following jobs would your husband help you accomplish?" Six household tasks were listed such as help clear table. The number of jobs with which husband helped was recorded. Scores ranged from 0-6.

108. The homemaker was asked if she thought women should work outside the home. Responses were coded 0=no, 1=yes under certain conditions, 2=yes.

110-
119. Judgements made by the interviewer (Reliability was established.) were made on the basis of a review of all data concerning the following:

110 - Degree of the wife's use of consumer information concerning clothing was scored on a five-point scale with 1=none to 5=much.

111 - Wife's knowledge of textiles was scored on five point scale with 1=none to 5=much.

112 - Sense of clothing adequacy - deprivation reported by the wife was coded on a five-point scale with 1=dissatisfied to 5=highly satisfied.

113 - Actual quality of the wife's wardrobe was coded on a five-point scale with 1=low to 5=high.

114 - Social mobility was judged on a five-point scale with 1=downwardly mobile, 3=static, and 5=upwardly mobile.

115 - Extent of conflict - harmony in the family was judged on a five-point scale with 1=intense conflict to 5=consistent harmony.

116 - Degree of family communication was coded on a five-point scale with 1=uncommunicative to 5=highly communicative.

117 - Extent patriarchal in authority pattern in the family was coded on a five-point scale with 1=matriarchal, 3=shared authority and 5=patriarchal.

Variable No.

118 - Use of structured planning in the family for use of money was coded on a five-point scale with 1=none to 5=much.

119 - Wife's knowledge of family finances was coded on a five-point scale with 1=none to 5=much.

6000 (9-66)

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ABSTRACT ***(250 words max.)***

This study investigated relationships between home environment and employment criteria for male workers.

The objectives were to identify patterns of characteristics of the home environment of skilled, semiskilled, and unskilled workers as they relate to employment records of the male, and to develop a rationale for a comprehensive study of relationships between employment and home environment.

The work population chosen was a sample of 40 employees of a midwestern manufacturing firm in a non-metropolitan area.

Employment variables selected included: wage group; mobility across wage groups; income received from the company, income from other sources, and total income; number of absences, hours absent, and absence due to illness and accidents.

Home environment variables included: clothing behaviors, housing, social characteristics, child development and family relationships, food and nutrition, management of resources and health.

The data were collected from three sources: the company, the homemaker and the husband.

The employment variables were positively related to psychological characteristics of the wife, such as home management abilities, including suggestions for house improvement, and clothing patterns such as type of clothing worn by the man to work, and clothing preferences of the wife.

Most of the above variables gave significant results in the study.

16. RETRIEVAL TERMS ***(Continue on reverse)***

17. IDENTIFIERS

MANPOWER REQUIREMENTS AND DEMAND IN AGRICULTURE BY REGIONS AND NATIONALLY, WITH ESTIMATION OF VOCATIONAL TRAINING AND EDUCATIONAL NEEDS AND PRODUCTIVITY

Project No. 4
Contract No. O. E. 5-85-108

Earl O. Heady
Peter Arcus

November 1966

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Iowa State University of Science and Technology

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I. INTRODUCTION

This project deals with estimation of labor and manpower requirements in agriculture and the related agribusiness sector for the nation and for as many as 144 regions of the country. It deals with estimation of the types of skills and work abilities that will be required by each. Finally, it deals with the types and amounts of education needed and the return on the corresponding investment for vocational and technical education in agriculture for the nation, for regional and commodity sectors, and for the associated agribusiness sectors. As it estimates the work force and skill requirements in agriculture, the study also must estimate the further migration of labor and population from agriculture and the manner in which vocational and technical education of the rural community can be adapted so that it appropriately serves both those who will stay on farms and those who will migrate. Changing technical and vocational training needs have been one of the most rapidly changing phenomena of the U.S. and will be even more rapid in the 15 years ahead. The skill and knowledge needs of agriculture will change greatly in kinds and amount as the number of farms is halved in the next one and a half decades and as the farming industry becomes much more specialized.

While the industry will use less of both family and hired workers, the upcoming specialized nature of farming will place most of the agricultural labor force in two categories: (a) managers who perform some work but will be most importantly engaged in the scientific managerial or decision processes in a highly technical and precise farming process and (b) skilled workers who will serve as hired help but will need technical abilities beyond the requirements of the typical farm operator-laborer in the previous generation. While there will be some seasonal and unskilled labor remaining in agriculture, this category will decline relatively in the next two decades. With the rapidly growing scientific orientation of farming, persons in local agribusiness operations which serve farming will need much greater and more sophisticated scientific and technical training. This need is reflected in the tendency whereby large chemical firms, through local representatives, are beginning to provide mathematically devised plans for farmers which incorporate all of the biological, physical and economic aspects of farm production and management. Such trends will require a high skill requirement, not only for the agribusiness personnel who must interpret the computer-divised plans for farmers, but also for the farmers who must put plans into operation.

This research project is pointed towards the changes in agriculture and its vocational and technical training requirements in the next one and a half decades. Hence, a large portion of the analysis relates to estimation of the structure of the agricultural work force and its skill requirements at future points in time. For parts of the analysis, however, it has been necessary to establish tendencies through estimation of regression equations based on time-series data and which allow projections into the future.

A. Objectives

1. To estimate manpower needs and labor demand in agriculture by 144 regions and nationally.
2. To relate manpower needs and skill requirements in agriculture to the structure and capitalization of farming and the scientific transformation of the industry.
3. To estimate manpower use and labor demand by categories including managers, temporary family labor, seasonal farm workers, permanent hired labor and other categories.
4. To relate the labor force of agriculture in terms of managers and workers to sizes, numbers, and structure of farms.
5. To estimate the off-farm labor force needed to serve agriculture regionally through the agribusiness sectors providing farm input services.
6. To determine the interrelationships of all of the above sectors in the use and skill training of labor relating to agriculture.
7. To outline the types, nature and operational methods of vocational training and technical education best adapted to serve the future structure of agriculture (including agribusiness sectors) in terms of farm managers, skilled farm workers and the various crops and livestock enterprises of the industry.
8. To estimate the marginal productivity of different amounts and types of vocational education and technical training so provided.
9. To outline an educational and training policy better suited to meet the needs and structure of future agriculture and agribusiness sectors.

II. METHODS

The quantitative analysis is being made by methods appropriate to six phases of the study.

(1) The application of input-output models to determine the interrelations among agricultural regions, agricultural commodities and the agribusiness sectors that serve agriculture through buying and selling activities. Once the matrix of these interdependency

coefficients has been established and projected, we can determine the effect on labor and on manpower and material requirements in the various regional, commodity and agribusiness sectors as change takes place in total demand and in the structure of a particular region or sector.

(2) The development and application of a mathematical programming model which allows specification for each of the 144 regions of agriculture and their major products and for the nation. This model, with the projection of technological change and the scientific transformation of agriculture, allows determination of the prospective structure of the nation's agriculture and the commodities, organization, degree of specialization, work force and skill requirements by each region. Although the estimates can be derived for each specific region, the model is built to allow expression of the simultaneous interdependence among regions -- an accomplishment possible only through this type of model. From these data, it is possible to generate the regional characteristics by degree of specialization, farm numbers and work-force requirements.

(3) The estimation, regionally and nationally, of the manpower requirements for different classes of workers and skills. This analysis requires estimation of time-series regression equations containing appropriate variables endogenous to the model, it is possible to indicate the total demand for labor of various classes and to indicate the number needed to enter the industry annually.

(4) The estimation, regionally and nationally, of the migration of labor from farms, with subsequent measurement or indication of the destination of these persons. These data are generated as a basis for indicating the major types of vocational and technical education needed in the rural community for the share of the farm labor force that leaves agriculture.

(5) The derivation of production functions that include variables representing different types and amounts of vocational training and education. The purpose of these estimates, insofar as they prove successful, is to measure the marginal productivity of vocational and technical training or education.

(6) More general quantitative analysis which uses coefficients from general sources to convert the other estimates into manpower needs for different commodities, regions and labor classes and to project the total requirements for vocational and technical education in each of these categories.

III. RESULTS

Progress and results are reported by methods and phases.

Each of the six categories of quantitative estimates explained above represents a fairly substantial empirical study. While data and time difficulties have occurred in some of the steps, progress has been made in all but one. In addition to these "heavy" quantitative analyses, the study also involves a policy or interpretative analysis to translate the empirical results into a specification of the amount, types and location of investment in vocational training and technical education for agriculture and for the agribusiness sectors of rural communities. The latter step involves, not only specification of the amount of facilities and investment needed by regions, but also a specification of curricula and course contents to conform with the developing structure of agriculture relative to the changing scientific and management characteristics of the industry and the stratification of labor into different groups than have prevailed in the past. Progress by the phases and methods is outlined below:

1. Intersectoral flows and dependencies for agriculture and labor.

This phase of the project is being analyzed through an input-output model of the conventional Leontief type. This model divides agriculture into regions and commodities to determine the flows and interdependence among them. It also relates each and all of these regional and commodity sectors to the nonfarm sectors which provide inputs or materials to agriculture and which acquire products for processing from the farm industry. This model is used to determine the effect of changes in national population and food demand on the input and labor requirements of agriculture on the various other sectors. These coefficients then are transformed into labor requirements in the agribusiness sectors. The initial goal was to complete this model for both 1960 and 1965 to allow projection of trends. Because data from the 1965 agricultural census did not become available soon enough in the year, however, only the model based on 1960 data could be completed. Upon extension of the project, the 1965 phase for the interrelationships among farm regions and products and the numerous agribusiness sectors will be completed. (Without extension of the project, interdependence coefficients based on 1960 alone will be used to measure the input and labor required as flows among sectors take place with various future final demand requirements on agriculture.)

The mathematical nature of the open model applied is outlined below. An open model refers to the condition that some sectors (i.e., farm regions, commodities and agribusiness sectors) are related to other sectors, but are not functionally dependent on them. Final demand (exports, government purchases, consumer purchases, etc.) is autonomously determined by factors outside the system. Labor and managerial services are then considered as inputs, but not as products functionally related to the household or family sector.

The open model is:

$$
(1)\quad
\begin{array}{l}
X_1 - X_{11} - X_{12} - \dots - X_{1n} = Y_1 \\
X_2 - X_{21} - X_{22} - \dots - X_{2n} = Y_2 \\
\vdots \\
X_n - X_{n1} - X_{n2} - \dots - X_{nn} = Y_n
\end{array}
$$

where X_1, X_2, ..., X_n represent gross output of the various economic sectors; X_{ij} (i, j=1, ..., n) represents actual flows of resource inputs and services from sector k to sector j; and Y_i (i=1, ..., n) are the flows to final demand sectors (household consumption, government, foreign trade). In this case, sector i (j) is a farm region, farm commodity or agribusiness activity.

The constraining assumptions made in input-output analysis are reflected in the relations between purchases or input demand of an endogenous sector (i.e., X_{ij}) and the level of output of this sector (i.e., X_j). Assuming a linear relationship the equation is:

(2) $X_{ij} = a_{ij}X_j + c_{ij}$

where a_{ij} and c_{ij} are parameters.

In the empirical work following, the assumption is made that $c_{ij} = 0$. The a_{ij} (the input-output, technological or requirements coefficient) is derived as the ratio between X_{ij} and X_j:

$$(3) \quad a_{ij} = X_{ij}X_j^{-1}$$

The input-output coefficient represents the direct requirement of sector j upon sector i per unit of output of sector j. In this sense, it serves somewhat as a "technological reflection of demand" by sector j, per unit of its output. The X_{ij} similarly reflect the "total demand" of sector j for input from sector i in this same "technological manner." Thus, if output of an agricultural sector (j) requires \$2 million of materials from the chemical sector (i), and if total output of the agricultural sector is \$200 million, the related technical coefficient is 2/200 = .01. The agricultural sector has direct requirement or "demand" for .01 dollar of inputs drawn from the chemical sector for each dollar of farm sector output, the total chemical "input demand" being \$2 million.

Substituting (2) into (3) yields:

$$(4) \quad \begin{array}{l} X_1 - a_{11}X_1 - a_{12}X_2 - \dots - a_{1n}X_n = Y_1 \\ X_2 - a_{12}X_1 - a_{22}X_2 - \dots - a_{2n}X_n = Y_2 \\ \quad \vdots \qquad\qquad\qquad\qquad\qquad\qquad \vdots \\ X_n - a_{n1}X_1 - a_{n2}X_2 - \dots - a_{nn}X_n = Y_n \end{array}$$

or in matrix notation:

$$(5) \quad X - AX = Y$$

where X is the vector of sector outputs, A is the matrix of input-output coefficients and Y is the vector of final demand quantities. Hence, with specified final demands, $Y_1, Y_2, \dots, Y_n$ and constant input-output or resource requirement coefficients, equation (4) can be solved for the outputs $X_1, X_2, \dots X_n$; the resulting equations are given in (6). The A_{ij}'s are elements of the inverse matrix $(I - A)^1$

$$
\begin{array}{ll}
 & X_1 = A_{11}Y_1 + A_{12}Y_2 + \ldots + A_{1n}Y_n \\
 & X_2 = A_{21}Y_1 + A_{22}Y_2 + \ldots + A_{2n}Y_n \\
(6) & \vdots \qquad\qquad\qquad\qquad\qquad\qquad \vdots \\
 & X_n = A_{n1}Y_1 + A_{n2}Y_2 + \ldots + A_{nn}Y_n
\end{array}
$$

or, in matrix notation:

(7) $X = (I - A)^{-1}Y$

Equations (1) and (4) represent the descriptive component, and equation (6) represents the analytical aspect of an input-output model. However, from the standpoint of labor and resource "demand" and intersector structure of agriculture, the elements of matrix A are of as much interest as those of $(I - A)^{-1}$. By using the definitional equation to simplify later presentation,

(8) $(I - A)^{-1} = B$

we have interest in A, to indicate all direct demand of sector j for demands on other sectors, and in B to indicate the sum total of direct and indirect demand upon a particular sector for a one-unit change delivered to final (consumer or exogenous) demand by a particular sector.

This model was applied to 90 sectors (regions and products) of agriculture and to 15 agribusiness sectors. The resulting coefficient matrix was 90 x 90 order. If the project is continued, the calculations will be extended to 1965 data, and the agribusiness sector will be divided into many more components. In either case, the step now being carried forward (the translation of the intersector interdependence coefficients into labor requirements) will be continued and projected into the future. The "gross model" for 1960 is completed. Extension of the analysis to 1965 and to more agribusiness sectors can greatly extend the detail of this part of the study, but also will require considerably more time and resources.

2. Programming projections of United States agricultural structure to the future, with indication of the production pattern, farm sizes and numbers, degree of specialization and work force by regions.

This analysis is being applied to the standard 144 agricultural regions of the study. It considers the 144 regions simultaneously since the degree of agricultural specialization and structural change of one region will depend on the relative advantage and role of other regions in meeting national food demands. This large-scale analysis is being applied for 1975 and 1980 and shows (a) regions which should shift to a different set of crop products and enterprises in the future, (b) the regions which will become more intensive and those which will be more extensive and decline most in manpower use, (c) the number and sizes of farms and the capital inputs and the labor force by regions and (d) other items relating to manpower and skill needs of farming per se.

The programming model developed for this step in the analysis involved 800 equations and 2,200 variables. Three solutions have been obtained with all major crops incorporated into the model. Basic and original intentions were to go as far as possible with these models during the 18 months for which the project was initially funded. A large empirical task was involved in accumulating and readying the data for the computations and in trial runs on the computer. Because of the mammoth amount of data to be assembled, ordered and processed, the project could be extended only through crops during the 18 months. Addition of livestock and realistic labor requirements and restraints requires that the model be extended to approximately 4,000 equations and 35,000 variables. However, inclusion of livestock can be accomplished if the project is extended.

The basic model specified which crop products will be produced in each of the 144 regions for future years and allows specification of the total labor requirements by these individual regions. The model indicates that some large regions, such as southeastern Wyoming, southern Colorado, parts of Missouri and many areas of the Southeast will shift from crops to forages and livestock, thus requiring different amounts of and skills for farm labor.

The actual model completed through the stage of machine computations during the year can be summarized as follows, where notation is provided only for each single region:

The basic manpower requirements, L_i, for the ith region (an individual one of the 144 regions) is determined as follows:

$$L_i = \sum_{e=1}^{t} \sum_{k=1}^{n} \alpha_{dgjk} \beta_{gjk} X_{ejk} \tag{8}$$

where α_{dgjk} is the amount of each type of standardized labor used for the gth farm operation on the kth product in the jth farm region, β_{gjk} is the amount of the gth farm operation used on the kth crop, and X_{ejk} is the amount of the kth product produced by the eth technology in the jth farm region. Summation is over crops and types of technology in the region.

The labor outcome for any one region can be determined only by total national demands, the labor and farm technology in all other regions for meeting these demands and the comparative advantage of the particular region. Hence, the model must include equations which express the restraints to production in each region, the labor-capital methods used and the general technology in the regions.

Total production in the ith region is restrained by the total cropland equation (9).

$$(9) \quad b_{10} \geq \sum_{k=1}^{4} a_{ijk}X_{jk} \qquad (i = j = 1,2, \ldots, 144),$$

and by the intraregional upper bounds on acreage for each crop in equation (10).

$$(10) \quad b_{ik} \geq a_{ijk}X_{jk} \qquad (i = j = 1,2, \ldots, 144; \; k = 1,2,3,4)$$

Minimum requirements for wheat, feed grains, and oilmeals in each consuming region are reflected in equations (11), (12) and (13), respectively.

$$(11) \quad d_{m1} \leq \sum_{j=1}^{n} X_{j1}P_{j1} + \sum_{r=1}^{31} T_{mr1} - R_s \qquad (m,r=1,2,\ldots,31; \; r\neq m);$$

$$(12) \quad d_{m2} \leq \sum_{j=1}^{n} X_{j2}P_{j2} + \sum_{r=1}^{31} T_{mr2} + R_s \qquad (m,r=1,2,\ldots,31; \; r\neq m);$$

$$(13) \quad d_{m3} \leq \sum_{j=1}^{n} X_{j3}P_{j3} + \sum_{r=1}^{31} T_{mr3} \qquad (m,r=1,2,\ldots,31; \; r\neq m).$$

The single national demand for cotton lint is specified as:

$$(14) \quad d_c \leq \sum_{j=1}^{144} X_{j4}P_{j4},$$

The symbols used in equations (9) through (14) are defined:

a_{ijk} = The amount of land used by one unit of the kth producing activity of the i = jth producing region; k = 1 for wheat, 2 for feed grains, 3 for soybeans, and 4 for cotton.

b_{ik} = The amount of land available for use by the kth crop in the ith producing region.

b_{10} = The total cropland available for production in the ith producing region.

c_{jk} = The cost of producing one unit of the kth crop in the jth producing region.

c_{mrp} = The cost of transporting one unit of the pth crop to (from) the mth demand region from (to) the rth demand region; r=30 is the maximum number of such activities that may occur for any crop since there are 31 demand regions.

c_3 = The cost of using one unit of wheat as a feed grain in the sth demand region (s=m). The cost is an artificial price differential in addition to the normal production costs.

d_c = The national demand for cotton lint expressed in pounds.

d_{mp} = The demand for the pth commodity, expressed in feed units, in the mth demand region; p = 1 for wheat, 2 for feed grains, and 3 for oilmeals.

P_{jk} = The per-unit output of the kth activity in the jth producing region, expressed in feed units for all except cotton lint, which is expressed in pounds.

$P_{j4'}$ = The oilmeal output, in feed units, of the cotton activity in the jth producing region.

R_s = The level of the activity transferring wheat into a feed grain in the sth demand region (m=s).

T_{mrp} = The level of transportation of the pth commodity to (from) the mth consuming region from (to) the rth consuming region.

X_{jk} = The level of the kth producing activity in the jth producing region.

The results of this model indicate some major regional changes for agriculture and its manpower requirements in the next

10 and 15 years. While the greatest number of the 144 regions will intensify their production, they also will become more specialized with a different emphasis in technology. However, a large number of regions in the fringe areas of the Great Plains and Corn Belt and over wide reaches of the Southeast are indicated to shift from present crop concentration to forage and livestock or forest farming. The labor requirements and manpower needs are computed accordingly. The basic means for establishing the number of farms and farm operators has been established and is ready for application. It should indicate the training requirements for farm managers by regions.

While detailed data are available for the 144 individual regions, a few national summary items are provided here on the predicted structure of agriculture. The national data show a projected shift of 75 million acres among field crops, and from field crops to grass and trees to 1980. The projected number of farms is slightly more than 2 million, with a work force of 3.5 million. In relation to the agribusiness sector, inflows of fertilizer and lime will increase nationally by 97 percent, livestock and feed by 36 percent, operating inputs represented by chemicals and related items will increase by 49 percent. Much greater details are available by regions and input or resource categories.

3. Estimation of demand equations for different classes of farm labor.

While the several facets already outlined have been completed or conducted, regionally and nationally, to determine the structure of agriculture and its related labor and training needs, the greatest part of the empirical work has emphasized the derivation, regionally and nationally, of labor demand and manpower requirements equations. The approaches used and some sample results are explained below.

Work on this phase of the project has been along two lines: the establishment of manpower requirements for agriculture for several future dates and the establishment of the training and educational requirements for this manpower. Work on both phases has been concurrent, although greatest emphasis has been on the manpower estimates to date. This emphasis is necessary so that manpower estimates are available for making specific recommendations about training and educational requirements. For manpower requirements and labor demand, a large number of regression models have been completed by the major regions and for the nation as a whole. The resulting equations have been reviewed, analyzed, modified and, where necessary, recomputed. A total of 4,000 equations were considered in this phase of the project. Resulting has been a set of equations meeting the desired standards established for the statistical analysis. Of the 4,000 equations, 140 equations have been selected each for hired labor, family labor and total farm operator labor.

After estimation of the labor demand and migration equations, it was necessary to project exogenous variables into the future so that manpower requirements could be estimated at the appropriate future dates. Hence, analysis for these exogenous variables was necessary. The first of these analyses was graphic and involved 144 graphs of the variables involved. The second analysis used regression and tested for linear, quadratic log and inverse trends in the exogenous variables. A total of 420 equations were computed.

For developing manpower demand, the equations were subjected to three criteria: (a) the highest possible R^2, (b) all regression coefficients significant at the .05 level or better, (c) no equation should predict a zero or negative net demand for labor. The first two of these requirements were used to meet statistical reliability; the third, to avoid nonsensical results. Labor-demand equations were established regionally and nationally for estimating all classes of farm labor -- farm population, hired labor, family labor and total labor. These estimates were made with models having 17 independent variables, representing several measures of both farm and nonfarm factors influencing farm labor requirements.

Several possible forms for the demand equations were established for each of the four labor groups. Data for each of the 17 independent variables were collected for 1938-64 in the national regressions and for 1940-64 in the regional regressions.

After some initial testing of the hypothesis that manpower projections could be made by using regression types of demand equations, the following plan evolved. First, a set of demand independent variables were selected for projecting exogenous variables to specified times into the future. These values of the exogenous variables then were entered in the estimated labor demand equations where they were relevant. These estimates have been completed, and the results indicate the predicted levels of farm population, hired farm labor, family farm labor and total farm labor in each of the regions and the nation at times in the future. For projections relative to the exogenous variables or measures, there are three estimates and an average for each measure in the national estimates. Evaluation and reconciliation of these estimates is just being completed. When anomalies (e.g., hired + family $\neq$ to total labor), are observed, reasons are being sought, and (if necessary) revisions will be made.

Using this information, predictions of the 1970, 1975 and 1980 values of all 17 variables of the labor demand equations in each of the regions and nationally were made. This step was essentially a computing job, and a computer program was written to produce, in an orderly fashion, the 1,260 values of the independent variables and their 1,260 logarithmic values.

As an example of the demand functions estimated both nationally and by regions, aggregative results are presented below for three of the classes of farm labor and farm population.

The Farm Population ($R^2 = .993$)

$$Y_4 = 7.3379 - \underset{(.0208)}{.0634}X_2 - \underset{(.0566)}{.2557}X_5 - \underset{(.2029)}{.6767}X_{15} - \underset{(.2759)}{.2599}X_{19}$$

Hired Farm Labor ($R^2 = .998$)

$$Y_5 = 5.1517 - \underset{(.0221)}{.1661}X_{1(t-1)} - \underset{(.0418)}{.2250}X_4 - \underset{(.0636)}{.1411}X_{15}$$

Family Workers ($R^2 = .989$)

$$Y_6 = 5.6391 + \underset{(.0249)}{.1710}X_{1(t-1)} - \underset{(.0506)}{.3587}X_5 - \underset{(.0205)}{.4319}X_{19}$$

Total Farm Labor ($R^2 = .990$)

$$Y_7 = 5.6646 + \underset{(.0221)}{.0780}X_{1(t-1)} - \underset{(.0449)}{.3221}X_5 - \underset{(.0182)}{.3565}X_{19}$$

where:

Y_4 = Farm population (1,000)

Y_5 = hired farm labor (1,000)

Y_6 = family workers (1,000)

Y_7 = total farm workers (1,000)

X_1 = farm wage rate (deflated index)

X_2 = net farm income (million dollars deflated)

X_4 = nonfarm income (million dollars deflated)

X_5 = nonfarm per capita income (dollars deflated)

X_{14} = the index of mechanical power (1957-59 = 100)

X_{15} = cropland per farm (index, 1957-59 = 100)

X_{19} = farm labor productivity (index, 1957-59 = 100)

All variables are measured in logarithms to the base 10, and the time-series observations are for 1940-64 inclusive. Similar results have been obtained for each of the individual regions.

Projections for a Corn Belt region in 1980 are presented below where units are 1000.

	1964	1980	Percent Change
The Farm Population	2,549	1,797	-30
Hired Farm Labor	156	131	-16
Family Workers	963	633	-34
All Workers	1,119	761	-20

This example parallels that for other regions wherein hired farm workers decline by less than family workers. Under the projected structure of agriculture developed in other phases of the study, we expect more year-around and skilled hired labor.

Throughout this study, extensive use has been made of Iowa State University's IBM 360-50 computer. A total of 15 programs have been written for this machine, to handle the particular problems of the project. Programs were written by personnel employed on the project and have provided for data generation, regression transformations, inverse transformations, independent variable projections, equation solutions and dependent variable predictions.

The demand for labor can be determined only in terms of the important variables that relate to its usage, quality and migration. The interrelationships among these variables are extremely complex and can be determined only after length analyses and comparisons of different time-series regression models. Variables used in this study include: trends in technology, farm labor productivity, farm income, farm machinery prices, farm wage rates, farm educational levels, the level of mechanization, the mix of farm products produced, per capita incomes of nonfarm employees, the population and age distribution of farm persons, the size of farms, the index of cropland per farm, the index of prices of land and farm buildings, the lagged unemployment rate, the levels of national income and total nonfarm employment, and others relating to both the number of persons and man-hour requirements. Various types of regression models were employed in these estimates. Both single and simultaneous equation models were explored in the analysis. Most of the estimates are based on single equation models, with various lags in independent variables.

The many results for the regions and nation cannot be presented here because of space limitations. Likewise, it is not feasible to present the demand equations and manpower projections for the future in each region and for each class of labor. As an extreme summary of types of predictions and interpretations available, simple national elasticities derived from the demand equations are presented for only two classes of labor: family labor and hired labor as two "gross categories." A summary of these elasticities is presented in the table.

IV. DISCUSSION

The translation of labor demand and manpower requirements into amounts and kinds of vocational education and technical training cannot be completed until final synthesis is made of the several sets of quantitative data discussed. Similarly, specification of organization and policy for this education in the rural community, directed towards both the farm and agribusiness sectors, cannot be completed until the synthesis of quantitative results has progressed. However, several alternatives to the present structure of vocational and technical training have been examined.

The quantitative results pose several hypotheses for the future structuring of vocational educational training for agriculture. The results of one model, the programming results explaining the interregional shifts and specialization of agriculture, can be used as an example. This model indicates some major shifts among regions, some shifting from crops to more extensive production with still fewer farms and a smaller labor force. Other regions would concentrate on a more intensive but highly scientific and specialized agriculture.

In a preliminary analysis, used as a guide and model to be followed in determining the amount and quantity of labor and hence, training required in those regions shifting their agriculture to a less intensive basis, it was found that vocational training units to provide the range and depth of skills required, would entail fewer vocational training departments devoted solely to farming. However, these shifts in farming and training structure also would require, in each of these units or departments, more than one specialist so that the expected and necessary subject matter can be covered. In addition, a smaller number of high schools covering a wider territory could be used for an advanced third year directed towards the managerial-oriented segment of the farm labor force.

In contrast to these regions expected to shift from more intensive to extensive farming, other regions are projected to maintain the same product mix but to increase the volume.

Demand elasticities for hired and family farm employees with respect to explanatory variables used in demand equations for hired and family farm employees.

Explanatory variable	Demand for hired farm employees	Demand for family farm employees
Price of agricultural resources		
Index of farm wage rate, X_1	-.149 to 0.404	.182 to .373
Index of the price of land and buildings, X_{10}	-.380 to -.545	-.325 to -.627
Index of the ratio of the farm wage rate to the price of land and buildings, X_{23}	-.071 to -.667	.196
Index of the ratio of the farm wage rate to the price of farm machinery, X_{24}	-.129	.248
Returns in agriculture		
Net farm income, X_2	-.095 to -.147	.071 to .184
Net income per farm, X_3	-.102 to -.138	.098 to .197
Nonagricultural returns		
Per capital income of nonagricultural employees, X_5	-.118 to -.337	.348 to -.636
Nonfarm economic activity		
Nonfarm income, X_4	-.147 to -.325	-.300 to -.558
Lagged number of employees on nonagricultural payrolls, $X_{6(t-1)}$	-.459	.255 to -.414
Lagged unemployment rate, $X_{7(t-1)}$	.035 to .083	.038 to .044
Mechanization		
Lagged index of stock of mechanical power and machinery, $X_{14(t-1)}$	-.115	-.066 to -.186
Technology		
Index of cropland per farm, X_{15}	-.141 to -.625	.862
Index of farm production per man-hour, X_{19}	-.117 to -.274	-.115 to -.432
Time, X_{22}	-.354 to -.822	-.760 to -1.54

However, the skill requirements in farming are stepped up to require more scientific knowledge, and attempt is being made to synthesize the knowledge requirements for managerial, vocational and technical training. Finally, a new model of training, related to the concept of the input-output matrix or resource flows, is being developed to provide estimates for the knowledge and skill requirements for the regional or local agribusiness sectors to serve agriculture.

V. CONCLUSIONS

We now summarize differences between the elasticities for family and hired labor as indicated in the table. This summary is only suggestive of the many detailed data available regionally and nationally from the study. (The variables specified are those included in the table.)

Comparing hired and family farm-labor demand with respect to the farm wage rate, the negative relationship on hired-labor demand and the positive effect on family labor is notable. Evidently, the demand for hired farm labor is a demand for labor as a competitive resource. The farm wage rate may be representative of returns in agriculture for family farm labor, hence the positive sign. It could be hypothesized that family and hired farm labor are close substitutes. When farm wage rates increase, family labor assumes a relatively stronger position in agriculture since hired labor is "priced out" as a resource.

When the price of land and buildings, X_{10}, is used as an explanatory variable, negative coefficients of similar elasticities are observed for hired and family labor. The absence of a land-labor substitution effect is implied by this negative effect of X_{10} on the demand for hired and family labor.

By using ratios of resource prices, a substitution effect of land and machinery for hired farm labor is observed. However, this is not the case with respect to family farm labor. The reason likely is that the farm wage rate represents a "price" for the hired-labor resource, but not directly for family labor.

Sign differences exist for demand elasticities between family and hired farm labor with respect to net farm income and net income per farm. Hired farm labor is negatively related to farm income, while family farm labor is positively related. The positive association of family farm labor is truly a decision variable for family labor in deciding whether to enter, remain in, or leave agriculture. The negative relationship of hired farm employees to farm income is not as obvious. The negative effect may lie in a complex substitution relationship between hired and family farm labor. With gains in farm income, accompanied by larger farms and greater mechanization, hired farm employment declines as family labor assumes a relatively stronger position in agriculture.

The per capita income of nonagricultural employees, X_5, exerts a negative influence on both hired farm labor and family farm labor. It can be observed from the table that the range of demand elasticities for family farm labor with respect to this variable is higher than the comparable range for hired farm employees. It could be inferred from these ranges that family farm labor is more responsive to changes to nonfarm income than is hired farm labor. It has long been hypothesized that hired farm labor lacks education and training. With these "supply" characteristics tending to hold hired farm labor in agriculture, hired farm labor appears as a more stable element of farm labor, in response to nonfarm earning opportunities, than family farm labor.

The demand elasticities of hired and family farm labor with respect to nonfarm activity (X_4) and lagged nonfarm employees ($X_{6(t-1)}$) indicates little differential effect between hired and family farm employment. However, in comparing the effect of the lagged unemployment rates ($X_{7(t-1)}$) on family and hired farm employment a differential tendency seems to exist. The range of demand elasticities is higher for hired farm employment than for family farm employment. Assuming this difference to exist, hired farm employees appear more vulnerable to nonfarm job opportunities than do family farm laborers. While family farm labor may be more responsive to a decline to nonfarm earning opportunities than are hired farm employees, this may result from the lack of training and job opportunities for hired farm laborers. When job opportunities do grow, as demonstrated by a low unemployment rate, hired farm laborers then appear responsive in movement from agriculture at a relatively fast pace. This out-movement would more readily be possible if hired workers were provided appropriate vocational training.

As has already been discussed, the mechanization variable ($X_{14(t-1)}$) shows little differential effect between hired and family farm employment. The effect of technology and trend variables appears to be larger on family farm labor than on hired farm labor.

The entire set of exogenous variables has, as explained earlier, been projected to future dates as the basis for estimating farm labor by regions and categories. These quantities are more important to the study than are the elasticities just summarized, but do not lend themselves to simple interpretation in limited space.

While the entire set of equations, nationally, regionally and by category of farm labor, has been estimated and while 140 have been selected for prediction and projection, a complete interpretation of the results has not yet been made. Additional time is required to complete this step and to translate it into manpower requirements by regions, with corresponding training and skill requirements by labor categories.

VI. SUMMARY

Six methods are being used in this study and include input-output models, programming models, time series demand functions, labor migration functions, production functions for educational inputs and more general quantitative analyses to indicate the amounts, types and skills of farm labor needed by products and regions for the future. Important progress has been made on four phases of the study and allows specification of the future structure of agriculture and labor demand by regions. The estimates allow specification of labor by classes such as managers, skilled hired workers, family personnel, etc. They also will allow indication of labor inputs represented through intersectoral flows of inputs through the agribusiness sectors related to farming. The variables of prices, technology, mechanization and others allowing prediction of future labor use by classes of labor have been completely regionally. The structure of agriculture for the 144 regions also has been estimated, as a basis for the upcoming step in establishing vocational education and technical training requirements for the different classes of labor.

Specification of the optimum amounts, forms and facilities of vocational education and technical training can be done only if we know or can project certain information. This includes the number of farms, the degree of specialization in the industry and the extent to which farming is organized around large-scale units with one manager and several skilled laborers, the capital/labor ratio of the industry and the number of workers in each labor category, the scientific and management orientation of the industry, and related phenomena. A basic analysis of training needs for the future, with respect to labor and its skills and types of regions, products and tasks in farming, requires prediction and projection of the structure of agriculture itself.

A prediction of the structure is required because it is expressed in various types of the capital items that farming uses. On the one hand, these capital items substitute for labor, thus helping to determine how many laborers there will be. Also, the capital items determine the size and number of farms that will exist. This information is needed to determine how many farms there will be, and how specialized and how large they will become in terms of managerial resources and work force. For example, we are projecting the number of two and three-man farms for the future. This will help to determine (a) the proportion of the farm work force for whom the main educational and vocational training needs are to emphasize managerial abilities, (b) the proportion who will operate the machines, equipment and enterprises and thus need skills training rather than managerial training, and (c) the proportion who will serve purely as laborers and need a different background.

Our projections show an eventual domination of American agriculture by two and three-man farms. On these, the second and third man will eventually be permanent hired personnel, but with skill requirement entirely different from the conventional farm laborer of the past. They will use employment in year-around hired work as a professional activity and will be outside the migratory and seasonal category. They will have responsibility for machine and equipment operation and for enterprise implementation once the manager has decided the program. Hence, they may well be the ones for whom the technical or vocational training in agriculture of the past best applies, but with a need for changing the orientation of this education. The farm operator and manager, on the other hand, will require a different mix of knowledge for management operations. Finally, the projected large-scale specialized unit in particular sectors of agriculture will use larger forces of the more typical labor, as well as supervisory and management personnel, which may be best trained by intensive short-courses, rather than by year-long technical training in the high school curriculum.

Work in the following period can take the following forms. The research being completed for the farm and agribusiness sectors can become a model for analysis of vocational education and technical training needs in other sectors of the economy. It is, however, necessary to develop an extremely large amount of background data and estimates if the predictions and formulations are to have greatest applied value in specifying actual training needs by locations, suboccupations and phases of an industry. The greatest accomplishments in synthesizing the basic estimates of amounts of labor in different classes, and in using these as the basis for creating models in training and educational policy, must thus follow in the next period of the study. Following the large accomplishments reported for the initial phase of the study, the greatest payoff in completion and application of the data should come in the next 18 months of the project.

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This project deals with estimation of labor and manpower requirements in agriculture and the related agribusiness sector for the nation by 144 regions. It deals with estimation of types of skills and work abilities that will be required. Finally, it deals with types and amounts of education needed and the return on the corresponding investment for vocational and technical education in agriculture.

This research project is pointed towards changes in agriculture and its vocational and technical training requirements in the next one and a half decades.

The quantitative analysis has been divided into six major phases: (1) the application of input-output models to determine the interrelations among agricultural regions, agricultural commodities and the agribusiness sectors that serve agriculture through buying and selling activities; (2) the development and application of a mathematical programming model which allows specification for each of the 144 regions of agriculture and their major products and for the nation; (3) the estimation, regionally and nationally, of the manpower requirements for different classes of workers and skills; (4) the estimation, regionally and nationally, of the migration of labor from farms, with subsequent measurement or indication of the destination of these persons; (5) the derivation of production functions that include variables representing different types and amounts of vocational training and education, and (6) more general quantitative analysis which uses coefficients from general sources to convert the other estimates into manpower needs for different commodities, regions and labor classes and to project the total requirements for vocational and technical education in each of these categories.

This research can become a model to analyze other vocational & technical training needs.

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PREDICTING CHANGE IN TECHNOLOGY, JOBS AND VOCATIONAL TRAINING NEEDS IN RURAL (NON-METROPOLITAN) LABOR MARKETS

Project No. 5
Contract No. O. E. 5-85-108

C. Phillip Baumel

November 1966

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I. INTRODUCTION

A. Background

The location of feed retailers has been largely determined by happenings at the beginning of the century. As Iowa developed into a grain producing state, there became a need for facilities to market the grain. Grain elevators started to dot the landscape. These grain elevators were invariably located along railroad tracks, which usually preceded the grain elevators by only a year or two. With horses the sole method of transportation available, grain elevators were located as close as six miles to each other, although eight or ten miles was more common. As the years passed, business increased for all elevators and very few went out of business. It was during the 30's that most grain elevators added grinding and mixing facilities to satisfy the demand for livestock feed. A complementary relationship had developed between grain and livestock production. It was also in this period of time that elevators started to market commercial feed. This commercial feed was usually manufactured in a larger plant and shipped by rail to the newly-born feed retailer. This was the beginning of a new era in agriculture. The changes that were to accelerate at this time were more rapid than anyone anticipated. More and better markets became available to the farmer. But probably the biggest boost to agriculture can be attributed to technology. Greater use of the telephone and radio aided communication ties between farmers and markets. The use of tractors shifted from a novelty to near necessity. New equipment for planting, cultivation and harvesting permitted farmers to expand their operations. Hybrid seed corn along with fertilizer substantially boosted land production and it was only a short time before herbicides and pesticides were in common usage. In addition, better feeds were formulated to meet newly established nutritional requirements.

These changes had a substantial impact on the structure of agriculture. The machine was more efficient than a strong back, and farm workers were not needed as they were used to be. Therefore, capital replaced labor. Specialized farming operations to various degrees became common. As farmers expanded their operations, small farms were consumed by larger farms. Farm numbers decreased and farm size increased. With all these changes, agriculture today would be an almost unrecognizable industry to the farmers of past generations. The end is not in sight. Agriculture today is moving as fast as at any time in the past.

Changes in the general economy have matched that of agriculture. The two have gone hand in hand. But at the beginning of the century, slow transportation limited farmer participation in most economic progress. Nearly all of his purchases and sales were limited to the nearest village. With horses as the only transportation, it was about an hour ride to travel five miles. A trip to the county seat was reserved for rare occasions, and a trip out of the county was sometimes never realized. But in the 1920's, Henry Ford provided a means of transportation that many could afford. The automobile and truck, along with hard surfaced roads, gave the farmer an opportunity to select where to buy and sell. There was a choice between the county seat and local village. Today, automobiles and roads are even better and the choice of markets ranges from the local village to distant markets. Since the turn of the century, transportation advances have expanded the marketing horizon from 5 to 50 miles without changing the travel time of one hour. It is likely that purchase and sales patterns have and will respond to the expanded market area. Fox has explained these changes in purchase and sales patterns in his concept of the functional economic area (5, pp. 13-23).

B. Functional Economic Area Concept

The Fox model theorizes that the county is no longer a practical unit of economic organization, but an area (functional economic area) larger than the county comprises a relatively self-contained economic area. Geographically, a functional economic area can be described as an area that is diamond-shaped, rotated square about a central city. The central city usually has a population of at least 25,000. The four points of the square are all exactly 50 miles from the central city. It is also 50 miles to every point on the perimeter of the square. This is true because of the rectangular road grid in the state of Iowa and much of the Corn Belt area.

Fifty miles is approximately one hours driving time, and Fox has hypothesized that this is the approximate upper limit that people will commute to work or to drive for a major shopping trip.

Besides the central city, of 25,000 population or over, there are complete shopping centers with populations of 5,000 - 25,000, partial shopping centers with 2,500 - 5,000 populations, and convenience centers with populations of less than 2,500 (6, pp. 13-14). It is hypothesized that the shopping centers can offer a wide range of products and services, and lower prices than the convenience centers because of use of a higher level of technology and economies of size. And by the same reasoning, the central city can in turn offer a wider range of products and services, and lower prices than the shopping centers.

To the farmer this would mean a saving on purchases and a bonus on sales. Today's farmers have their own trucks to take advantage of these opportunities. In 1964, 53% of farmers owned their own trucks (11, pp. 13, 35). This is an increase from 35% in 1955 (10, pp. 13, 35), and 11% in 1945 (9, pp. 14, 47). The number of farm trucks will undoubtedly become larger as the central city opportunities increase.

Through all the agriculture and economic development, the feed retailer has attempted to stay abreast. Decentralization of feed manufacturing is occurring in all parts of the country. Smaller, highly automated and efficient plants are being built in or near the market area to be served. The role of the retail dealer is changing as he is called upon to offer a broader line of products designed for specific uses, as well as a broader line of services to his progressive customers. Most important of the services offered in grain producing areas is custom grinding and mixing. Some of the other services offered are bulk delivery, credit, grain banking, a sales-service man, and marketing assistance (4, p. 15).

But with all these changes, where, how many, what size, and what kind of feed retailer would best serve the farmer?

C. Objectives

This study is a part of a much larger study. The main objective of the larger study is to predict changes in job opportunities and vocational training needs in rural labor markets.

This study was conducted within the framework of the functional economic area concept and is concerned with one agri-business industry; namely, the feed retailing industry.

The objectives of this thesis are:

1. To determine if any relocation of feed retailers to a different size city is taking place, and if so, at what rate and to what size city.

2. To determine if feed retailers in different locations using different levels of technology are offering different prices or different services to their customers.

3. To determine the current education and vocational requirements for employees of feed retailers using different levels of technology.

4. To predict the level of technology to be used by feed retailers in the future, and to determine the future educational and vocational requirements for employees in this predicted level of technology.

D. Review of Literature

There is a great deal of literature on the subject of cost standards in feed mills. It is important to point out that these reports are primarily concerned with feed manufacturing rather than feed retailing. However, feed retailers are engaged in some of the same activities as feed manufacturers.

Vosloh has published several marketing research reports on cost standards for different activities of feed manufacturing plants. These publications deal with cost standards for the receiving (19), processing (22), pelleting (20), packing (21), and warehousing (1) activities. The emphasis is placed on labor and capital requirements for feed manufacturers with differing volume capacity. Standards include operating and investment costs.

The Midwest Feed Manufacturers Association published a report on costs of different size feed mills (13). The publication gives man-hour requirements per ton for receiving, processing, mixing, pelleting, packing, and warehousing in 30 ton, 100 ton, and 200 ton capacity feed mills. Again the standards are more meaningful to manufacturers than retailers.

There have been many publications of mutual interest to feed retailers and feed manufacturers. Greer and Dahl made a study on industrial and geographical changes in feed manufacturing (7). The conclusions of the study were: 1. a sizable decrease in the number of small mills occurred from 1954 to 1959, followed by a modest decrease from 1959 to 1964, 2. a locational shift in commercial feed manufacturing from the Twin Cities area and northern Minnesota to areas of heavy livestock concentration, and 3. the development of "satellite" plants in heavy feed consumption areas by large feed manufacturers. The authors conclude that "It appears reasonable to raise new hope for the location of large-scale feed manufacturing activity in rural areas of Minnesota" (7, p. 2).

Vosloh and Brensike also made a study of the changes in the feed mixing industry (18). Among the principal trends noted were the increase in farm size, integration of the feed industry and livestock production, bulk delivery of feed, direct sales to farmers, and the growth of on-farm and custom mixing. From 1955 to 1959, geographical trade areas increased more for Iowa feed retailers who offered mixing facilities than those retailers who did not mix. About one-half of feed retailers in Iowa offered mixing services.

Schruben and Clifton recently published a detailed set of various truck costs (17). Costs per ton and per mile for both bulk and sacked feed would be a valuable application to determine the possibilities of expanding a trade area.

A publication that is of primary concern to feed retailers is by Phillips (15). It is concerned with costs of procurring, manufacturing, and distributing mixed feeds. Cost data from four different types of retailers were studied: 1. premix operation with mixing done by dealers, 2. concentrate operation with grain added by dealers, 3. centralized complete feed operation through dealers without mixing facilities, and 4. independent manufacturer-retailer operation. Results showed that the independent manufacturer-retailer had slightly lower costs than the others. The publication studies the components of production, procurement, overhead, sales, and transportation costs for each of the four feed distribution methods.

E. Basic Hypothesis

Based on the Functional Economics Area concept, the basic hypothesis is that people would increase purchases and sales in retail centers and decrease purchases and sales in convenience centers. This in turn would give way to the trend of increasing business activity in central cities and decreasing business activity in retail centers and convenience centers. The basis of this hypothesis is that larger business operations can offer lower prices and/or better services because of use of a higher level of technology and economies of scale.

F. Model

A recursive linear program was formulated to study this problem of the retail feed industry. A recursive linear program is a sequence of linear programming problems in which the objective function and the constraint matrix depend on the solution of the previous time period (2, p. 51).

A linear programming problem has three quantitative components: an objective function (typically to maximize income or minimize cost), alternative methods or processes for attaining the objective, and resource or other restrictions (8, p. 3). The problem can be restated: Which of the alternative processes and what levels should be used to maximize income, given that certain quantities of resources are available?

Linear programming is mainly a procedure for providing normative answers to problems. By normative we refer to the course of action which ought to be taken by an individual, business unit, area, or other economic sector (8, p. 8).

One might summarize the meaning of a recursive linear program as the description of optimizing over a limited time horizon on the basis of knowledge gained from past experience. A recursive linear program expresses the manner in which economic plans are reformulated as each period's experience is accumulated (2, p. 52). The solution to the recursive linear program of the last time period will be used as parameters in the recursive linear program of this time period. And the solution to the recursive linear program of this time period will be used as parameters in the recursive linear program of the next time period.

The recursive linear program required the subdividsion of a functional economic area into eight different types of townships depending on their distance to the three location centers. The three location centers are defined as: 1. convenience center with population 2,500 or less, 2. retail center with population 2,501 to 25,000, and 3. a central city with population greater than 25,000. As Table 1 indicates, each type of township was a different number of transportation units from each location center.

Table 1. Hypothetical transportation units to location centers from different types of townships in a functional economic area

Township	Convenience Center	Retail Center	Central City
T_1	1	-	1
T_2	1	-	3
T_3	1	3	5
T_4	1	1	7
T_5	1	3	7
T_6	1	1	9
T_7	1	3	9
T_8	1	3	11

II. METHOD

A. Sampling Procedure

The population was comprised of firms listed as feed retailers in the handbook of the Iowa Grain and Feed Dealers Association that were located within the NIAD and TENCO Functional Economic Areas. NIAD is a nine county area centered around Mason City (3). TENCO is a ten county area centered around Ottumwa (16). The list was supplemented by a priori knowledge to make the population more complete.

The population was stratified on the basis of the size of the location center. The selected locations were the control cities (greater than 25,000 population), retail centers (2,501 - 25,000), and convenience centers (2,500 and less). Included in the population were 11 retailers in the two central cities, 45 in retail centers, and 143 in convenience centers. It was arbitrarily decided that the sample would include all feed retailers in the central city, one-half of the firms in the retail centers, and one-fourth of the firms in the convenience center.

All retailers in the retail centers and convenience centers were numbered consecutively within their location centers. To determine which firms in the retail centers would be chosen for the sample, a pencil was dropped on a table of random numbers until a 1 or 2 was chosen. By this method, firms numbered 2, 4, 6, 8, etc. were selected from the population list. By a similar procedure (until a 1, 2, 3, or 4 was selected), firms numbered 4, 8, 12, 16, etc. were selected to be in the convenience center sample. Sixty-eight firms comprised the sample. Eleven were located in the central city, 22 in the retail centers, and 35 in the convenience centers.

Some problems were encountered in locating the selected firms. Some firms had gone out of business or discountinued retailing food. In other cases, the manager was not available or refused to participate. In the event that a firm could not be interviewed, the firm next on the population list was chosen for a substitute. For example, if firm number 8 was out of business, then firm number 9 was chosen for a substitute. However, no substitutions were possible for central city firms because a census was taken of this population.

The numerical data obtained from the questionnaire were analyzed in the seven different categories of:

1. Dollar feed sales

2. Sales per employee

3. Percent of total business in feed

4. Percent of total feed business within a 10 mile driving distance

5. Miles to most distant customer

6. Number of feed services offered

7. Feed prices

The data collected by the survey were analyzed by the analysis of variance technique.

III. RESULTS

The following null hypotheses were accepted:

1. There is no difference in dollar feed sales between NIAD and TENCO or among the location centers within these areas.

2. After adjusting dollar feed sales with number of services by covariance analysis, there remains no difference in dollar feed sales between NIAD and TENCO or among the location centers within these areas.

3. There is no difference in dollar feed sales per employee between NIAD and TENCO or among the location centers within these areas.

4. There is no difference in percent of total business in feed between NIAD and TENCO or among the location centers within these areas.

5. There is no difference in percent of total feed sold within 10 miles driving distance between NIAD and TENCO or among the location centers within these areas.

6. There is no difference in miles to most distant customer between NIAD and TENCO or among the location centers within these areas.

7. There is no difference in feed prices between NIAD and TENCO or among the location centers within these areas.

The following null hypotheses were rejected:

1. There is no difference in number of services offered between NIAD and TENCO.

2. There is no difference in number of services offered among location centers.

In the opinion of the feed retailers interviewed, locational advantages were thought to be an advantage in the following location centers:

1. Convenience centers had the advantage in lower property tax, closeness to customers, and better transportation-out.

2. Retail centers thought it was an advantage that farmers were doing more non-agricultural business in their location center that, in turn, increased feed sales.

3. Convenience centers and retail centers together had an advantage in cheaper labor.

4. Central cities were thought to have an advantage in being close to a packing company.

5. Transportation-in was thought to be equally advantageous to all location centers.

This study was not successful in identifying in different levels of technology or determining labor requirements in the feed retailing industry. Therefore, objectives number 2, 3, and 4 were not achieved.

IV. DISCUSSION

Analysis of data

a. Dollar feed sales

The null hypotheses are:

1. H_o: There is no difference in 1965 dollar feed sales between the NIAD and TENCO areas.

2. H_o: There is no difference in 1965 dollar feed sales among the three location centers.

Table 3. Average 1965 dollar feed sales and number of retailers for the different location centers in NIAD and TENCO

Area Location Center	Number of Retailers	Average 1965 Feed Sales in Thousands
NIAD		
Convenience Centers	20	$336
Retail Centers	10	$208
Central City	4	$555
TENCO		
Convenience Centers	11	$ 59
Retail Centers	9	$227
Central City	5	$102

As Table 3 indicates, the average 1965 feed sales are quite different for NIAD and TENCO. In NIAD, the average sales are lowest for the retail centers; but in TENCO, the retail centers have the highest average. It is also interesting to note the absolute difference in average sales for convenience centers and central cities between the two areas. Results from the Analysis of Variance test are in Table 4.[1]

Table 4. Results from Analysis of Variance that test null hypotheses number 1 and 2 using data in Table 3

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	84253.44	1	84253.44	2.96
L (Location Center)	19921.32	2	9960.66	0.35
Error	56805.80	2	28447.90	
Total	161070.56	5		

---

[1] A similar test for 1965 dollar feed sales was conducted using a factor of interaction between area and location center. The model was

$$Y_{ijk} = U + A_i + L_j + (AL)_{ij} + e_{ijk}$$

However, the calculated F value was not significant at the 95% level for area, location center, or interaction.

The table values for $F_{.95(1,2)} = 18.5$ and $F_{.95(2,2)} = 19.0$. Therefore, the calculated F is not significant and both null hypotheses are accepted. Apparently there is no difference in 1965 dollar feed sales between the NIAD and TENCO areas or among the location centers within the areas.

b. Sales per employee

The null hypotheses are:

3. H_o: There is no difference in 1965 dollar feed sales per employee between the NIAD and TENCO areas.

4. H_o: There is no difference in 1965 dollar feed sales per employee among the three location centers.

Table 5. Average 1965 dollar feed sales per employee and number of retailers for different location centers in NIAD and TENCO

Area	Location Center	Number of Retailers	Average Sales per Employee
NIAD			
	Convenience Centers	20	$ 87
	Retail Centers	10	$ 73
	Central City	4	$180
TENCO			
	Convenience Centers	11	$ 27
	Retail Centers	9	$ 33
	Central City	5	$ 39

The results in Table 5 show average 1965 dollar feed sales per employee to be much larger for the NIAD area. Within each area the average for the central cities is larger than for the other location centers. A high sales per employee should point out the more efficient firms and probably a higher level of technology. Results from the Analysis of Variance test are in Table 6.

Table 6. Results from Analysis of Variance that test null hypotheses number 3 and 4 using data in Table 5

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	9680.16	1	1680.16	6.77
L (Location Center)	3976.33	2	1988.16	1.39
Error	2860.33	2	1430.17	
Total	16516.82	5		

The table values for $F_{.95}(1,2) = 18.5$ and $F_{.95}(2,2) = 19.0$. Therefore, the calculated F is not significant and both null hypotheses are accepted. Apparently there is no difference in 1965 dollar feed sales per employee between the NIAD and TENCO areas or among the location centers within the areas. The feed retailers are about equally efficient, and on the average are probably using approximately the same level of technology.

c. Precent of total business in feed

The null hypotheses are:

5. H_o: There is no difference in the percentage of total business in feed between the NIAD and TENCO areas.

6. H_o: There is no difference in the percentage of total business in feed among the three location centers.

Table 7. Average percent of total business in feed and number of retailers for different location centers in NIAD and TENCO in 1965

Area Location Center	Number of Retailers	Percent of Total Business in Feed
NIAD		
Convenience Centers	21	39%
Retail Centers	12	46%
Central City	4	81%
TENCO		
Convenience Centers	14	53%
Retail Centers	10	48%
Central City	5	56%

Table 7 indicates that in the NIAD area, the average percent of total business in feed increases as the size of the location center increases. In the TENCO area, the average percent among location centers is very similar. The percent of total business in feed would indicate to some degree how much firms were specializing in feed. And the degree of specialization would indicate what type of business the retailer is conducting. Results from the Analysis of Variance test are in Table 8.

Table 8. Results from Analysis of Variance that test null hypotheses number 5 and 6 using data in Table 7.

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	13.50	1	13.50	0.07
L (Location Center)	646.33	2	323.17	1.62
Error	399.00	2	199.50	
Total	1058.83	5		

The table values for $F_{.95(1,2)} = 18.5$ and $F_{.95(2,2)} = 19.0$. The calculated F is not significant at the 95% level and the null hypotheses are accepted. Apparently there is no difference in the percentage of total business in feed between the NIAD and TENCO areas or among the location centers within each area. The degree of specialization in feed is about the same for feed retailers in all location centers and both areas.

d. Percent of total feed business within a 10 mile driving distance

The null hypotheses are:

7. H_o: There is no difference in the percentage of total feed sold within a 10 mile driving distance between NIAD and TENCO areas.

8. H_o: There is no difference in the percentage of total feed sold within a 10 mile driving distance among the three location centers.

Table 9. Average percent of total feed business within a 10 mile driving distance and number of retailers for the different location centers in NIAD and TENCO in 1966.

Area	Location Center	Number of Retailers	Percent of Total Feed Business within a 10 Mile Driving Distance
NIAD			
	Convenience Centers	21	91%
	Retail Centers	12	95%
	Central City	4	44%
TENCO			
	Convenience Centers	14	90%
	Retail Centers	10	70%
	Central City	5	89%

If the percentage of total feed business within a 10 mile driving distance would be low, it would indicate a larger trade area. As Table 9 indicates, the percentage in NIAD is much lower in the central city. In TENCO, the percentage is somewhat lower in the retail center. Results of the Analysis of Variance test are in Table 10.

Table 10. Results from Analysis of Variance that test null hypotheses number 7 and 8 using data in Table 9

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	60.17	1	60.17	0.09
L (Location Center)	597.33	2	298.67	0.47
Error	1265.33	2	632.67	
Total	1922.83	5		

The table values for $F_{.95(1,2)} = 18.5$ and $F_{.95(2,2)} = 19.0$. The calculated F is not significant at the 95% level and the null hypotheses are accepted. Apparently there is no difference in the percent of total feed sold within a 10 mile driving distance between the NIAD and TENCO areas or among the location centers within each area. Trade areas for different location centers and areas are about the same.

e. Miles to most distant customer

The null hypotheses are:

9. H_o: There is no difference in the miles to the most distant customer between the NIAD and TENCO areas.

10. H_o: There is no difference in the miles to the most distant customer among the three location centers.

Table 11. Average miles to most distant customer and number of retailers for the different location centers in NIAD and TENCO in 1966

Area Location Center	Number of Retailers	Miles to most Distant Customer
NIAD		
Convenience Centers	21	12.5 mi.
Retail Centers	12	13.7 mi.
Central City	4	31.0 mi.
TENCO		
Convenience Centers	14	15.4 mi.
Retail Centers	10	26.4 mi.
Central City	5	21.0 mi.

It was thought that the size of the trade area would have a direct relationship to the miles to the most distant customer. Results are in Table 11. In the NIAD area, the average of the miles increases with the size of the town. In the TENCO area, the retail center shows the highest average of miles to the most distant customer. Results of the Analysis of Variance test are in Table 12.

The table values for $F_{.95(1,2)} = 18.5$ and $F_{.95(2,2)} = 19.0$. The calculated F is not significant at the 95% level and the null hypotheses are accepted. Apparently there is no difference in miles to the most distant customer between the NIAD and TENCO areas or among the location centers with each area. Trade areas for different location centers and areas are about the same.

Table 12. Results from Analysis of Variance that test null hypotheses number 9 and 10 using data in Table 11

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	5.23	1	5.23	0.08
L (Location Center)	145.21	2	72.61	1.12
Error	129.62	2	64.81	
Total	280.06	5		

f. Number of feed services offered

The null hypotheses are:

11. H_o: There is no difference in number of services offered between NIAD and TENCO.

12. H_o: There is no difference in number of services offered among the location centers.

Table 13. Average number of services offered and number of retailers for the different location centers in NIAD and TENCO in 1966

Area	Location Center	Number of Retailers	Number of Feed Services Offered
NIAD			
	Convenience Centers	21	5.1
	Retail Centers	12	5.1
	Central City	4	3.8
TENCO			
	Convenience Centers	14	4.2
	Retail Centers	10	3.5
	Central City	5	2.6

It is logical to assume that farmers would tend to patronize retailers who offered more services. The results on number of feed services are in Table 13. In both NIAD and TENCO, the average number of services decreases as the size of the location center increases. Also, the average number of services is larger in NIAD than TENCO. Grain banking and drying were two services that most NIAD feed retailers offered that most TENCO feed retailers did not offer. Results of the Analysis of Variance test are in Table 14.

Table 14. Results from Analysis of Variance that test null hypotheses number 11 and 12 using data in Table 13

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	2.28	1	2.28	37.00
L (Location Center)	2.29	2	1.14	18.57
Error	.12	2	0.06	
Total	4.69	5		

The table values for $F_{.95(1,2)} = 18.5$ and $F_{.90(2,2)} = 9.0$. The calculated F is significant at the 90% level for location centers, and is also significant at the 95% level for NIAD and TENCO areas. Apparently there is a real difference in number of services offered between the NIAD and TENCO areas, and also among the location centers in each area. Convenience centers offer more services than retail centers, and retail centers offer more than central cities. NIAD offers more services than TENCO.

g. Feed prices

The null hypotheses are:

13. H_o: There is no difference in feed prices between NIAD and TENCO.

14. H_o: There is no difference in feed prices among the location centers.

Table 15. Average feed prices and number of retailers for the different location centers in NIAD and TENCO on August 15, 1966

Area	Location Center	Number Retailers	Feed Prices
NIAD			
	Convenience Centers	21	\$6.45/cwt.
	Retail Centers	12	\$6.43
	Central City	4	\$6.37
TENCO			
	Convenience Centers	14	\$6.38
	Retail Centers	10	\$6.44
	Central City	5	\$6.43

If farmers are going to change their purchase patterns, a lower feed price would be a probable prerequisite. Results in Table 15 show the average prices are nearly the same for all location centers in both areas. Results of the Analysis of Variance test are in Table 16.

The table values for $F_{.95(1,2)} = 18.5$ and $F_{.95(2,2)} = 19.0$. The calculated F is not significant at the 95% level and the null hypotheses are accepted. Apparently there is no difference in feed prices between the NIAD and TENCO areas or among the location centers within each area. Feed prices are approximately the same for all location centers and both areas.

Table 16. Results from Analysis of Variance that test null hypotheses number 13 and 14 using data in Table 15

Source of Variation	Sum of Squares	df	Mean Square	F
A (Area)	.0000	1	.0000	0.0066
L (Location Center)	.0012	2	.0006	0.2450
Error	.0050	2	.0025	
Total	.0062	5		

V. CONCLUSIONS

At this time there is no evidence to show that relocation of feed retailers to different size cities is taking place. The study suggests that the feed retailing industry tends to be a convenience oriented industry. On the average, there appears to be no incentive for the farmer to go any further than his nearest feed retailer who in most cases, is just a few miles away. However, this does not preclude that a few individual firms have not been successful in attracting new customers from a local trading center. If other feed retailers expect to increase feed sales, incentives must be established. More and better services and lower feed prices would be the most obvious incentives to increase feed sales. Innovations in organization and services are other possibilities for increased feed sales.

VI. SUMMARY

A. The Problem

The problem of this study was twofold: 1. to determine if any relocation of feed retailers to a different size city was taking place, and if so, at what rate; 2. to determine the level of technology being used by different feed retailers and the educational requirements for employees in each level.

B. Method of Solution

The initial effort to investigate this problem was through the use of a recursive linear program within the concept of a functional economic area. A functional economic area was subdivided into eight hypothetical types of townships with each type having a different objective function. For the T_3 townships, the objective function was:

$$\text{Minimum Total Cost} = (r_1+p_c)X^t_{3c} + (r_2+p_s)X^t_{3s} + (r_3+p_f)X^t_{3f}$$

where

r = transportation cost for the different location centers to T_3 townships
p = feed price per ton at the different location centers
x = tons of feed sold at the different location centers
c = convenience center
s = retail center
f = central city
t = current time period

The recursive feature of the model was that tons of feed sold in each location center (X^t_3) changed in each time period. These changes were limited by constraints to specified increases or decreases.

Four different types of feed retailers were defined, and it was arbitrarily decided to interview three of each type. In interviewing, there were two problems encountered. First, different levels of technology could not be clearly identified. Most firms were using more than one level of technology for the different activities performed in the feed retailing business. The second problem was that of cost identification. Inconsistencies between retailers in bookkeeping prevented obtaining meaningful cost data. Meanwhile, data from the Iowa Grain and Feed Dealers Association Directory showed a decreasing number of retailers in all location centers of the Fort Dodge functional economic area. But the data revealed nothing about total dollar feed business in each location center, or levels of technology being used by feed retailers.

A more direct approach was then taken to investigate the problem. A survey was taken of 66 feed retailers in all three location centers of the NIAD and TENCO functional economic areas. The numerical data obtained from the questionnaire was tested in seven different categories.

1. 1965 dollar feed sales
2. Sales per employee
3. Percent of total business in feed
4. Percent of total business within a 10 mile driving distance
5. Miles to most distant customer
6. Number of feed services offered
7. Feed prices

An Analysis of Variance test was used to determine if any real differences existed between the NIAD and TENCO areas or among the three location centers.

The model was:

$$Y_{ij} = U + A_i + L_j + E_{ij}$$

where Y_{ij} = one of the seven factors to be tested

U = effect of mean

A_i = effect of i^{th} area

L_j = effect of j^{th} location center

E_{ij} = error

Also an Analysis of Covariance test was used to test difference in 1965 dollar feed sales. The covariance adjusting factor used was number of services offered. The model used was:

$$Y_{ij} = U + A_i + L_j + BX_{ij} + E_{ij}$$

where Y_{ij} = 1965 dollar feed sales

U = effect of mean

A_i = effect of i^{th} area

L_j = effect of j^{th} location area

BX_{ij} = covariance factor

E_{ij} = error

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ABSTRACT ***(250 words max.)***

The study found that convenience centers offer more services than retail centers, and retail centers offer more services than central cities, and that NIAD offers more services than TENCO. However, no difference was found between the NIAD and TENCO areas or among the location centers in each area in terms of a. Dollar feed sales, b. Sales per employee, c. Percent of total business in feed, d. Per cent of total business within a 10 miles driving distance, e. Miles to most distant customer, or f. Feed prices.

The study suggests that the feed retailing industry tends to be a convenience oriented industry. But it was not successful in identifying different levels of technology or determining labor requirements in the feed industry.

6. RETRIEVAL TERMS ***(Continue on reverse)***

7. IDENTIFIERS

THE POTENTIAL CONTRIBUTION OF PSYCHOLOGY TO INTERDISCIPLINARY RESEARCH IN VOCATIONAL-TECHNICAL EDUCATION

Project No. 6
Contract No. O. E. 5-85-108

Edwin C. Lewis
Mary Heiserman

November 1966

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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I. INTRODUCTION

A. Problem

Recent advances in psychology have produced concepts and information that are proving of considerable value to education. After a period during which psychologists neglected the field of education in favor of laboratory research, they are becoming aware of the needs and implications of their work for education. As a result, the educational implications of psychological research are being stressed with increasing frequency, and research being conducted by psychologists more often is done with educational needs in mind.

For the most part, however, this interest has been focused on traditional academic education, with less concern for other forms as exemplified in vocational and technical education. We believe that the Iowa State University Department of Psychology, by virtue of its strong basic research orientation and its position within a university with strong vocational and technical concerns, is in a unique position to make this needed contribution. Specifically, we intend to explore the current developments in psychology that have educational implications and to develop means by which these can be directly related to the needs of vocational and technical education. Where gaps are found, research will be conducted to fill these gaps, within the competencies and interests of the professional staff members of the Department of Psychology.

B. Objectives

1. To collect information concerning the current status of research and knowledge derived from the application of psychological principles and methodology to the study of educational problems.

2. To organize this information so as to provide guidance for persons engaged in vocational and technical education and to stimulate the development and execution of research projects to fill current gaps in knowledge.

3. To work closely with the members of the Iowa State University Department of Psychology, as well as with persons with related interests in other departments, to inform them as to current research needs in vocational and technical education to which psychologists might contribute, and to aid them in the development and execution of research proposals related to these needs.

4. To propose and develop methods by which psychologists, both at Iowa State and elsewhere, can make substantial contributions to research in vocational and technical education.

II. METHOD

This project has been underway for only about six months, and our results are therefore limited. Our first step, which has occupied most of our time thus far, has been a comprehensive survey of the psychological literature to locate research studies which have potential implications for vocational-technical education. We have relied primarily on the Psychological Abstracts for this survey, although we have included other sources too.

On the basis of the preliminary survey, the studies are arranged into areas which appear to have special importance for vocational and technical education. Each category is considered in detail, with the studies relevant to each category described and related to each other. From these descriptions, we hope to arrive at general conclusions concerning those areas in which research evidence is lacking and in which important contributions can be made by psychologists. Finally, we intend to design specific research projects aimed at closing these gaps.

III. RESULTS

The preliminary survey of the literature has been completed, with the possibility of later additions, and we have developed categories of research areas. We have concentrated thus far on those categories that seem to have direct implications for vocational-technical education, and we are in the process of summarizing the research literature in those categories, with emphasis on the implications for vocational-technical education and the gaps which might be filled by further research. The categories that we are analyzing include:

I. Academic achievement.

II. Counseling (including both counseling techniques and the use of tests).

III. Demographic characteristics of students (with emphasis on the characteristics of rural students and the implications for education).

IV. Teaching methods as they relate to students in vocational and technical programs.

V. Occupational choice (including the process of vocational development and factors influencing the choice of a specific occupation).

VI. School environment (variables within the school setting that influence student goals and performance).

VII. Student characteristics (including aspiration level, interests, and abilities).

Our time has been limited, and we are not close to the completion of this phase of the project. We have, however, drafted a preliminary report summarizing the research in the area of student characteristics as related to educational and vocational performance. Although not in its final form, this summary should serve as a representation of the form of the final report, which will cover research in all areas listed and will also recommend research studies which can and should be undertaken by psychologists.

IV. DISCUSSION

A. Student Characteristics

Level of aspiration. Psychological research dealing with the aspiration level of high school students is fairly extensive and may be considered from several standpoints. A few studies deal directly with the influence of the high school upon aspiration level; other articles are more generally concerned with the effect of success and failure on performance. Much of this literature also deals with the possible effects of socio-economic class, family influence, place of residence, and race upon occupational aspiration. Still other studies stress attitudes and personality factors, including the student's personal expectations, needs, and interests.

Studies dealing rather directly with the influence of the high school on student aspirations are exemplified by a survey of studies by Boyle (12), who concludes that the type or kind of school attended influences aspirations and that these goals are related also to variations in educational standards and kind of peer-groups likely to exist in a given type of school. Researchers such as Rosenfeld and Zander (49) point out that the teacher is an influential person in suggesting student aspiration and that students tend to accept teacher suggestions when they are rewarded, but tend to ignore or oppose teacher desires when indiscriminate coercion is perceived. These authors believe that these tendencies affect the degree to which students set their aspired grades congruent with their perceived capacities. In this same study, teacher disapproval of inadequate performance seemed to have no effect on aspirations, but teacher disapproval of a good (at level of capacity) performance seemed to have a negative effect.

In his study of the level of aspiration of academically successful and unsuccessful high school students, Byers (13) concluded that both past and current experiences with academic tasks is related to goal-setting patterns of students in the actual classroom situation. However, Byers believes that past experience operates only until subjects gain experience in the current task. According to this study, failure seemed more closely associated with high and unrealistic goal-setting than did success experiences, which seemed closely related to realistic goal-setting. Hilgard (29) also considered school success in relation to level of aspiration and he, like Rosenfeld and Zander (49), stressed the educator as an influential person in helping to keep student goals realistic and attainable and in reducing social pressure. Hilgard writes that individually suitable, though relatively low-level, goals must be dignified and respected. An investigation by Bochow (9) found aspiration level relating, not only to the school situation or sequence of events, but also to individual goals, differences, and conflicts arising from high levels of aspiration.

Several aspiration-level studies have dealt with the more general aspect of the effect of success and failure on performance and with the influence upon student goals or ambitions of factors such as need for achievement (n Ach), fear of failure, reaction to frustration or anxiety, and ability. Investigators concerned with effects of success and failure on aspirations via n Ach or motivation include Feather (18, 19), Tureck and Howell (63), Dani (16), and Moulton (47). Feather's study (18) on level of aspiration and achievement imagery attempts to bring together aspiration studies and McClelland's (42) studies of achievement motivation by investigating the relationship between relaxed and achievement-oriented situations. Mean goal discrepancy scores showed a significant increase from Relaxed to Achievement-oriented situations. Achievement-projective scores also showed an increase from Relaxed to Achievement-oriented situations. Results were interpreted in terms of a dominant "fear of failure" set in the Relaxed situation and a dominant "hope for success" set in the Achievement-oriented situation. Similarly, Tureck and Howell (63) investigated success and failure situations and intensity of n Ach. They concluded that (a) when success preceded failure, the proportion of success acting alone did not influence intensity of n Ach., (b) when failure preceded success, n Ach score varied inversely with the proportion of success, and (c) when failures exceeded successes, greater n Ach was expressed when success followed failure than when failure followed success. A related study by Dani (16) investigated level of aspiration as a function on n Ach and fear of failure.

In a later study, Feather (19) found that a subject's expectation of success before task performance is positively related to n Ach in situations providing accomplishment opportunities. The finding that initial expectations were negatively related to test anxiety was interpreted by Feather in terms of the influence of past experience in related situations and may reflect the effect of subjective attractiveness of success and of repulsiveness of failure. A recent study by Moulton (47) found that subjects with a high fear of failure and a low n Ach raised their level of aspiration after failure and lowered it after success. In Moulton's study, instructions that were intended to reduce the degree of underestimation of the probability of success increased low levels of aspiration.

Studies dealing with student fear of failure and with student reaction to frustration and anxiety include those by Schroder and Hunt (53), Mahone (40,41), Lowe (38), and Amin (2). Schroder and Hunt tested hypotheses relative to failure-avoidance behavior in situational interpretation and errors in problem-solving situations. The subjects who made avoidant interpretations of failure and criticism (a) avoided failure in a problem-solving situation, (b) maintained their self-evaluation after criticism, (c) stated higher evaluations following a low "failing" score, and (d) over-evaluated their performance. In addition, the subjects who used failure-avoidant behavior in a problem-solving situation (a) set higher goals (b) used fewer alternative solutions in attempting to solve the problem, and (c) performed less effectively after failure. Schroder and Hunt emphasize the consideration of certain other personality variables of obvious importance (e.g., psychological need or motive) in further research. In addition, they contrast their theory of "failure-avoidance" with the "fear of failure" concept of Atkinson (5) and they recommend further investigation of these constructs. Mahone (40) found that realism of vocational aspirations is related to n Ach and to the assessment of one's capability. He contends that a student who fears failure tends to be unrealistic, rather than to aspire realistically and thus be forced to "prove himself."

Still other aspiration-level studies have investigated reactions to success and failure and the influence of ability on aspiration level. Lichtenberg (37), in his study on reactions to success and failure during individual and cooperative effort, found that a failure of early action in non-creative tasks "causes" more persons to lower their estimation of the probability of successfully completing their task when working alone than when working cooperatively. Gruen's (24) study of a new level of aspiration test found that responses to a verbal maze varied in the expected direction with the experience of success or failure. A more recent study by Lachman (36) showed how systematic manipulation of length of task practice periods can maximize the probability of success or failure. His results indicated that aspirations rise with success, fall with failure, remain close to performance level, and remain above rather than below performance level. Research conducted by Mohr (44) concerned ability tasks as a function of both level of ability and motivation conditions, whereas Muthayya (48) found a lack of relationship between achievement and aspiration level, intelligence and aspiration level, and achievement and intelligence. Fruchter (21) investigated ability patterns in technical training criteria and pointed out possibilities in analyzing criteria as a method for understanding the variance in technical training course grades and other proficiency criteria.

The amount of psychological literature dealing with the possible effects of socio-economic status, the family, place of residence, and race upon student aspirations is considerable. In a study of social class attitude and level of occupational choice in school-leavers, Jahada (1953) found that lower social class members over-rated aspiration level more than did other subjects. Seidman (56) and Stefflre (58,59) studied intelligence, socio-economic background, and student ambition, finding that duller students from each social-economic group aspire downward, while the brighter ones aspire upward. Similar findings by Empry (17) indicate that, although the higher social classes have higher aspirations, lower social-class students aspire more highly than did their fathers. Still another study by Weiner and Murray (66) supports Empry's conclusions by indicating that lower-class parents now wish their children to attend college and, thus, to aspire more highly than previously was the custom.

Closely related to socio-economic class are the factors of family influence and place of residence. In their study of class and family influences on aspiration level, Bennett and Gist (8) reported that urban students showed little variation of aspirations and plans among social classes, but that occupational plans varied significantly with class. Urban versus rural place of residence also proved relevant to student aspiration level, as is shown in studies by Hodgkins and Parr (30), Haller (25,26), Haller and Sewell (27), Moreland (45), and Grigg and Middleton (23). Hodgkins and Parr, however, believe that socio-economic status bears more relationship to aspiration level than do urban-rural differences.

Somewhat stronger emphasis on place of residence is given by Haller (26), who writes that the lower educational aspiration levels of farm-reared youth in the city stem from "farming" as a normal part in the student's self-concept. He further indicates that rural youth underestimate the importance of education in achieving occupations, and he points to the need for further hypothesis-testing in this area. The studies by Grigg and Middleton and by Moreland also considered both educational and occupational aspiration levels, stating that educational, rather than occupational, aspirations are lower for rural than for town or city students.

A few studies have attempted to relate this "place of residence" influence and race factors to aspirational level. Contrary to expectations, Holloway and Berreman (31) did not find a consistent tendency for the level of aspiration of elementary school pupils to be associated with social class, nor were there any significant differences between Negro and white pupils in aspirations when social class was held constant. In another study, Smith (58) investigated the personal and social adjustment of Negro children in rural and urban areas of the South and found no differences between the two groups as measured by the California Test of Personality.

Still another research concern in the realm of aspiration level has been that of attitudes and personality factors, including student expectation and needs. When questioned about vocational preferences and their reasons for these preferences, Hurlock and Jansing's (32) subjects indicated that scholastic achievement had little bearing on their vocational choice. Sewell, Marshall, Haller, and DeHart (57) found the variables of education, socio-economic status, ethnic group, sex, father's occupational status, size of farm, and age to be related to the attitudes of rural students toward school. Schutz and Blocher (54) also found level of occupational choice to reflect student attitude, or more specifically, various aspects of self-concept. A study by Ryan (51) investigated factors affecting realistic and unrealistic occupational choice and found such choices related to aspects of self, aspects of reality, and aspects of key persons (awareness of others).

Research connected with student personality factors, such as expectations and needs, has been conducted by Wren (69), Greig (22), Wilson (67), Stephenson (61), and Heath, Maier, and Remmers (28). Wren, Heath et al. found that workers aspire most for power, prestige, and income and that aspiration level is related to dominance, intelligence, educational status, family occupation, and income. The study by Greig emphasized the lack of useful knowledge that many (1/3) students possessed in regard to their preferred job and stressed implications of the results for social psychology and guidance. Although Stephenson's study indicates that occupational aspirations have little relationship to either family occupation or community needs, the study by Wilson (67) showed a fair correspondence between vocational choice and opportunity, with a large number of choices in the skilled and semi-skilled job areas. However, as in earlier studies, occupational plans in the Stephenson study were somewhat more in line with community needs than were aspirations. Still other research in the area of student aspiration level has been conducted by Lurie (39), Stubbins (62), Walder (65), Arsenian and Laird (4), Kledzik (35), Winslow (68), Schwartz (55), and Cotter (15). However, this research seemed less relevant for the problem under consideration.

B. Interests

Psychological research concerning student interests that seems to have implications for vocational-technical education may be considered in terms of (a) the influence of interests on both vocational choice and school achievement and (b) the development and stability of interests. Bedford's (6) study of the vocational choices and interests of rural high school students indicates that vocational interests often bear no relation to available vocational opportunities and that subjects often lack knowledge of the training required for their chosen field. In this study, only a small percentage of students chose industrial or agricultural fields, while the professional areas were often chosen without apparent justification.

A study by Stefflre (59,60) emphasized level of interest as related to vocational aspiration level and concluded that this interest level furnishes a rough index of direction and extent of the student's aspiration as expressed through the selection of vocational objective. A study of Rubisoff (50) attempts to relate interest-values to occupational attitude and choice.

Several studies have been concerned with how interests influence school achievement. A study of interests and general educational development by Frandsen (20) upheld the hypothesis that interests correlate with achievement when achievement involves performance over time and found that interest factors are influential in course selections. Although Jackson (33) also found interests and course selection to be related, his findings did not support a significant relationship between interest and intelligence, vocational course success, or grade average. In investigating interest scores in predicting success in vocational school programs, Motto (46) found that the Kuder Preference Record did not differentiate successful from unsuccessful vocational school trainees, and Samuelson (52) found a significant but limited predictive value for Kuder Record items. Still another study, by Armstrong (3), investigated the interests and social adjustments of under-achievers and normal achievers at the secondary school level. Allen (1), Behrend (7), Valeriu (64), and Collins (14) have also stressed the influence of interests on achievement.

An article by Book (11) suggests that, to help a student develop interests, educators must (a) build new interests on old ones, (b) secure new information, (c) plan work so that students can succeed in order to (d) make the student exert himself fully and vigorously toward his task. Bondoreveskii (10) investigated the formation of vocational interests in high school pupils with vocational training. This study reports that academic and vocational interests are affected by the type of industrial training undertaken in work-study programs, by the organization of work in industrial settings, and by the influence of the teacher. Finally, McCoy (43) has investigated stability and change of measured vocational interests of high school students. Other research concerning interests relates more directly to the subject area of guidance and will be discussed in connection with that literature.

C. Summary

Inasmuch as the major purpose of this project is to stimulate psychological research focused on problems of vocational and technical education, we shall consider here the major implications of the studies previously described for teaching and research.

Student Characteristics

Level of aspiration. Studies dealing with the influence of the high school teacher upon student aspiration stress the educator as a model for student performance and appropriate goal-setting. This situation poses the potential research question of how teachers may best utilize their position to help students develop realistic and attainable goals and to reduce social pressures upon students by dignifying and respecting relatively low-level goals. In addition, valuable research might be conducted to ascertain what kinds of teachers provide effective models for the less academically oriented students.

Studies dealing with the effect of success and failure on performance emphasize the influence of the student's achievement motivation, fear of failure, and expectation upon aspiration level. These findings suggest that the teacher may maximize the probability of success and help the student to deal with success and failure situations by understanding the effect of achievement motivation and of student expectation on aspiration level, on school performance, and on vocational realism.

Research on social class and urban-rural differences in aspiration level indicate that socio-economic status bears more relationship to aspiration level than do urban-rural differences, although rural youth do seem to underestimate the importance of education in attaining occupations toward which they aspire. The increased social mobility of today's youth and their relatively higher aspiration levels should impress the educator with his responsibility to help students set realistic and attainable goals and should also encourage research in this area.

Interests. Studies dealing with the relationship between interest and vocational choice indicate that vocational interests often bear no relation to available vocational opportunities and that students often lack knowledge of the training required for their chosen field. This situation, and the fact that only a minimal relationship seems to exist between interest and school success, should offer opportunities for research as to how teachers and guidance counselors may inform students about existing opportunities and as to how interest measures may be improved or developed to better predict vocational school success.

V. CONCLUSIONS AND IMPLICATIONS

Because this report covers only a portion of the total scope of the research to be surveyed, it is premature to draw general conclusions and implications. These will be appropriate when the entire project has been completed.

VI. SUMMARY

A survey of the literature concerning psychological research applicable to vocational and technical education has revealed a broad range of research studies, which have subsequently been organized into relevant areas. In this report, research studies concerning two areas of student characteristics-level of aspiration, and vocational interest--have been described and their implications for teaching and research in vocational and technical education have been discussed.

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15. ABSTRACT ***(250 words max.)***

The purpose of this study is to survey the literature concerning psychological contributions to educational research, with particular reference to those studies which have implications for vocational and technical education. On the basis of this survey, the investigators intend to delineate those areas in which further knowledge is needed and recommend ways in which psychologists can make important contributions to vocational and technical education. The phase of the project reported here is concerned primarily with the psychological variables of level of aspiration and student interest as influences on educational goals and achievement.

16. RETRIEVAL TERMS ***(Continue on reverse)***

17. IDENTIFIERS

DETERMINANTS OF THE POST-HIGH SCHOOL EDUCATIONAL AND OCCUPATIONAL CHOICES OF IOWA FARM BOYS

Project No. 7
Contract No. O. E. 5-85-108

Donald R. Kaldor

November 1966

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

Iowa State University of Science and Technology

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I. INTRODUCTION

A. Problem

Technological and economic forces have been reducing the opportunities for farm boys to enter farming and earn incomes comparable to those offered by many nonfarm occupations. As a result, many have been leaving the farm. Large numbers will continue to seek employment in farm related and urban oriented industries in the future. However, many of these industries are demanding workers with a higher level of skill and training. If farm boys are to compete on equal terms in the competition for nonfarm jobs, many will have to prepare themselves better than in the past. For this to happen, there must be adequate opportunities for post-high school training and farm boys must take advantage of these opportunities. This study is designed to add to our knowledge of the process and determinants of the post-high school educational and occupational choices of farm boys and particularly the obstacles which prevent further investment in training and education.

B. Objectives

1. To describe the post-high educational and occupational plans and experiences of farm boys.
2. To analyze the variables determining these plans and experiences.
3. To identify and measure the obstacles that prevent investment in post-high school training and education.
4. To estimate the amount of underinvestment in advance training among Iowa farm boys.

II. METHOD

Objectives 1, 2 and 3 will be achieved by an analysis of data obtained from a state-wide sample of 790 farm boys during surveys conducted in 1959, 1962 and 1966. Hypothesis developed from the theory of choice presented in Iowa Station Research Bulletin No. 508 will be tested by use of regression analysis to determine the variables influencing educational and occupational plans and experiences. This will permit an evaluation of the obstacles preventing investment in post-high school training. Objective 4 will be achieved by applying an investment model being developed under Iowa Station project 1358 to the sample of high school graduate farm boys. This model will permit estimates of the costs and returns from advanced training for farm boys having different intelligence quotients and different high school scholastic records.

III. RESULTS

The work on this study has not been carried to the point where results are available.

IV. DISCUSSION

Data for this project were collected in a series of statewide surveys conducted in 1959, 1962 and 1966 covering a sample of 790 farm boys who graduated from Iowa non-metropolitan high schools in the spring of 1959. These data have been coded and punched on IBM cards for analysis. The data collection phase of the work was financed by state funds. In September 1966, the Strategic Intelligence unit made available $2,000 to help finance the analysis phase. Work on this phase is now moving ahead but results will not be ready for distribution for several months.

V. CONCLUSIONS AND IMPLICATIONS

Conclusions and implications must await completion of the analysis phase.

VI. SUMMARY

This project is aimed at increasing the stock of knowledge of (1) the determinants of the educational and occupational choices of farm boys, (2) the factors that restrain post-high investment in education and (3) the amount of under or over investment in advanced training among farm boys. This is to be accomplished by an analysis of data collected in three periodic surveys of a sample of 790 high school graduates and the application of a cost-returns investment model developed under Iowa Experiment Station project 1358. The data have been collected and partially processed.

VII. REFERENCES

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This project is aimed at increasing the stock of knowledge of (1) the determinants of the educational and occupational choices of farm boys, (2) the factors that restrain post-high investment in education and (3) the amount of under or over investment in advanced training among farm boys. This is to be accomplished by an analysis of data collected in three periodic surveys of a sample of 790 high school graduates and the application of a cost-returns investment model.

16. RETRIEVAL TERMS *(Continue on reverse)*

17. IDENTIFIERS

AN ANALYSIS OF LEGAL AND POLITICAL PROBLEMS AND THE STRATEGY NECESSARY FOR IMPLEMENTING PROGRAMS UNDER THE VOCATIONAL EDUCATION ACT OF 1963

Project No. 8
Contract No. O. E. 5-85-108

Donald E. Boles
Charles W. Wiggins

November 1966

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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I. INTRODUCTION

In the process of introducing vocational education and training adequate for individual fulfillment within the national society and in providing opportunities for citizens who wish to work in or near their home community, substantial modifications will occur in social, economic and governmental institutions.

There is considerable literature in the social sciences that seeks to analyze rural community structure and the process of change in smaller cities and rural communties.

A. Problem

To be most useful to the decision-makers of vocational educational policy, systematic research is being directed to such questions as how governmental resources are allocated in the manner in which they are. Given the national legislative goal of expanding vocational education, the national policy-makers particularly wish to know and understand elements inhibiting and encouraging the development of vocational education locally to maximize support for vocational educational programs.

B. Objectives

Research is being directed towards the following questions:

1. What are the present laws and administrative arrangements governing vocational educational programs?
2. What are the principal aspects of existing programs--leadership, organization, procedure, financing--and how do these differ among the states?
3. What factors (interest and environmental) act or have acted upon the state legislatures?
4. In what ways have these forces influenced the states' vocational policies as prescribed by the state legislatures?
5. In what ways do these factors account for the variations between states' indecisions regarding vocational educational programs?
6. In what ways can conditions influencing vocational educational policy output be altered to meet national legislative goals? (See model).

II. METHOD

Answers as to how any government allocates its limited resources with respect to education are being obtained by consulting state statutes, administrative rules, budgets and official decision-makers. Answers as to why resources are allocated are being assimilated by examining those factors (e.g., available revenues) and forces (e.g., interest-group pressures) having an impact upon authoritative decisions and also by studying the ways that environmental or situational factors, such as level of community income, community mores and existing institutional or legal arrangements, limit possible courses of action open to governmental decision-makers.

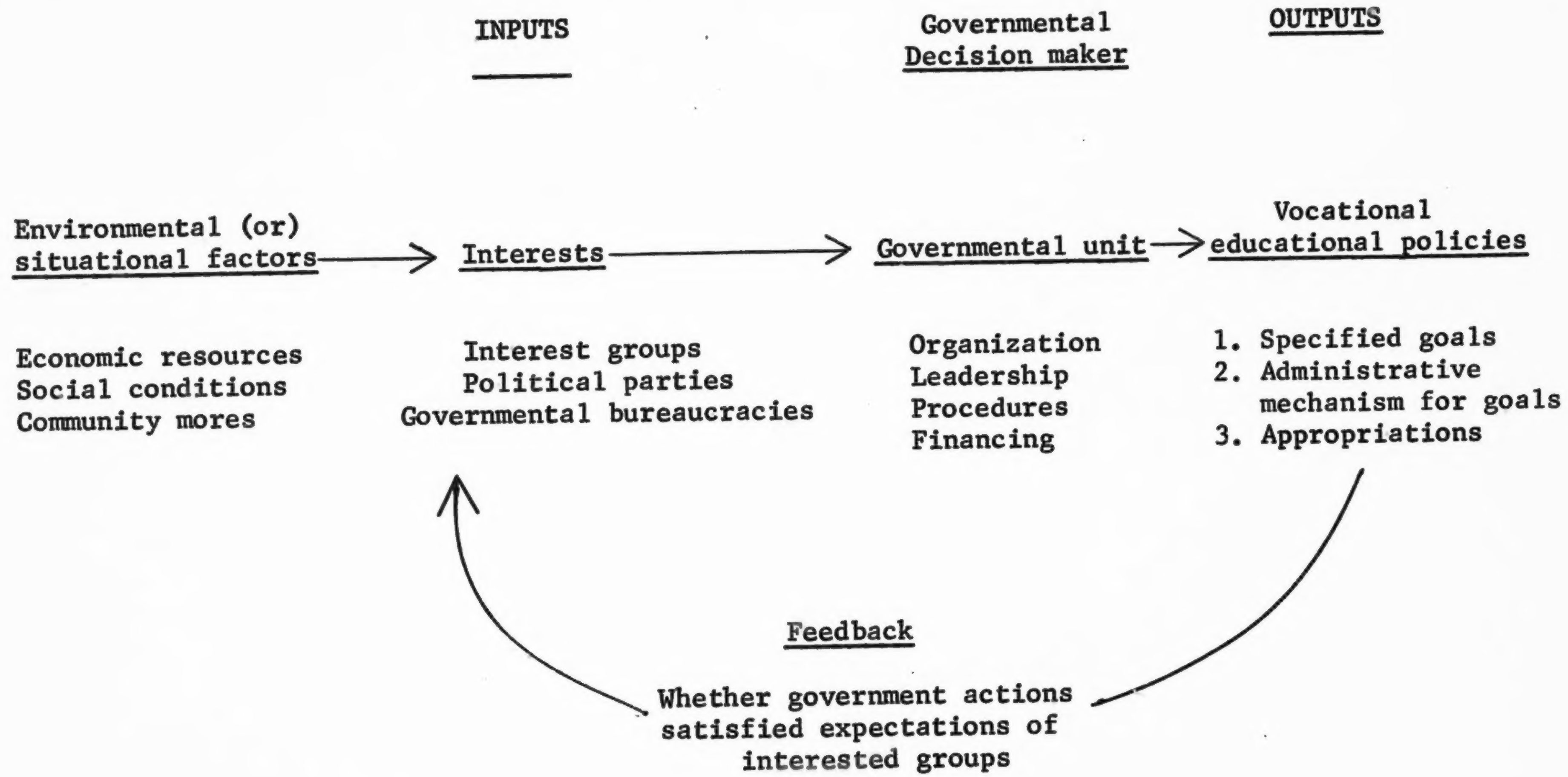
Several states and their subdivisions having sizable rural or non-metropolitan populations are under study. Four states are being chosen that differ in important respects, particularly in the types of existing vocational programs, or in the degree to which they have obligated themselves financially to vocational education.

Within the selected states, the initial institutional focus will be upon the state law and legislative process, assuming that the legislatures are somewhat central and instrumental in shaping the vocational educational policies of the states.

III. RESULTS

A. No significant conclusions can be drawn because of the short duration of the project.
B. A study of the process of evolving a program of area vocational schools in Iowa has been completed and is briefly summarized in the Summary section of this report (1).
C. A systematic annotation of the Federal Vocational Education Act is underway.
D. A comprehensive bibliography of studies dealing with vocational education is being compiled. Special emphasis here is placed upon ephemeral studies by state and federal agencies.
E. Another study has been completed in which special attention has been given to the Congressional Hearings held on the legislative history of the Vocational Education Act of 1963 and related measures and the statistical data found therein (2). This data will be helpful in selecting the four key states.

Figure 1. A Diagram of Vocational Educational Decision-Making


INPUTS
Governmental Decision maker
OUTPUTS
Environmental (or) situational factors
Interests
Governmental unit
Vocational educational policies
Economic resources
Social conditions
Community mores
Interest groups
Political parties
Governmental bureaucracies
Organization
Leadership
Procedures
Financing
1. Specified goals
2. Administrative mechanism for goals
3. Appropriations
Feedback
Whether government actions satisfied expectations of interested groups

IV. DISCUSSION

Preliminary analysis indicates that seven factors should be employed in this selection process:

A. Regionalism

State vocational programs tend to vary by region. The southern states tend to stand out as having programs that generally differ in significant ways from those of states in other regions of the country.

B. State Effort

States tend to vary in the amount of support given to vocational education. The per-capita expenditures by the states for such training is one measure of support.

C. Participation

Although undoubtedly related to state support, the proportion of individuals eligible for vocational programs actually enrolled in such programs seems to vary from state to state. This factor may be a distinguishing criterion of independent importance. It may, for example, reflect the success of state vocational agencies and officials in devising programs that encourage individuals to participate.

D. Program Emphasis

State programs vary as to the emphasis placed upon certain types of training. Some states continue to emphasize agricultural and home economics training, while trade and industrial training tends to receive greater emphasis in other states.

E. Administrative Structure

It appears that major differences exist among groups of states in the legal structures employed in administering vocational educational programs. For example, institutions of higher learning have the primary responsibility in some states for program administration. In other states, state boards of education have the major responsibility.

F. Centralism versus Localism

In some states, educational decision-making powers are centralized in the state agency having over-all administrative responsibility. In others, the state administrative agency merely sets down general policy guidelines, the effect of which is to allow local educational agencies a marked degree of autonomy in making decisions on programs to be offered within the local community.

G. Program Quality

Finally, general program quality tends to vary among the states. Although we have not been able to define the specific factors to be employed in determining variations in program quality, it is our impression that some states are noted for having high quality vocational education programs, while others seem to have programs not considered of high quality. Subsequent interviews with qualified experts on state vocational programs should permit us to select those factors usually employed in assessing program quality variations among the states.

V. CONCLUSIONS AND IMPLICATIONS

Although no firm conclusions have been reached regarding criteria to use in selecting the four states for intensive study, preliminary analysis indicates the seven factors discussed above should be used in the selection process.

VI. SUMMARY

During the course of this project there has been completed a study titled The Evolution of Vocational Educational Legislation and Related Measures (ref. 2). This study includes pertinent sections, references, summaries and analyses of the Adult Education Act (1966), Vocational Education Student Loan Insurance Act (1965), Economic Opportunity Act (1964), National Education Improvement Act (1963), Vocational Education Act (1963), Manpower, Development and Training Act (1962) and (1965), National Defense Education Act (1958), Area Redevelopment Act (1961), appropriations for vocational education (1961-1965). It also provides an in depth investigation into the Hearings on the Vocational Education Act of 1963 and a tentative, working bibliography which includes: Mr. E. T. Chase's article "Learning to be Unemployable," which discusses some of the educational and employment problems encountered with the coming of greater industrial and business automation; an article titled "The Best Place for Vocational Education" by J. B. Lack that studies the pros and cons of where in the student's academic career vocational education should begin; and an outline of the book Man, Education and Work by Grant Venn. This work traces the evolution of vocational educational legislation from 1917 through 1965.

Analysis of this data indicates that seven factors can be employed in selecting certain states for close analysis: regionalism, state effort, participation, program emphasis, administrative structure, centralism versus localism, and program quality. Constructive policy evaluation may be evident from this comparative research of regional development of vocational educational programs.

Another research report has been completed analyzing the establishment and implementation of the law of the 1965 Iowa legislature authorizing area vocational schools. This study is titled *Governmental Implications of Area Vocational-Technical School and Community College Development in Iowa* (ref.1). It shows the statewide administrative structure provided for in the development of not more than twenty area vocational schools that were authorized. These schools are direct entities of the state responsible to the State Department of Public Instruction and to no other governmental entity in the strict legal sense. They are units that are superimposed over the local and county school units and do not replace or consolidate with any existing school divisions including the state's sixteen junior colleges. A bill proposed to the legislature in 1963 asked that sixteen area school units be created and that they replace all existing county units. This may have been a much more realistic approach than the development we see today. At the time of the completion of the study eleven districts had been approved for area vocational schools with one-fourth of the state of Iowa not yet assigned to any district. It is expected that four or five more districts will soon emerge.

Existing county school governing bodies have had to plan and develop these area districts yet they will have no control over their operation once the districts have been approved by the State Board of Public Instruction.

The legislature appropriated six million dollars for capital outlay and four million for operating expenses of up to four area schools. Since eleven area districts have already been approved, the question now arises can the funds be allocated equitably and provide the necessary aid intended by the legislature. Of these eleven areas, six have been approved for community college programs permitting them to develop both college transfer functions and vocational-technical programs. The other five have been approved for vocational-technical schools only. This can only result in the necessity for altering the basic functions of these five schools in a few years to meet the demand for community college training.

Wherever possible these area schools are to provide educational opportunities and service in the following areas though not restricted to only these areas: a) the first two years of college work including pre-professional education; b) vocational and technical training; c) programs for in-service training and retraining of workers; d) programs for high school completion for students of post-high school age; e) programs for all students of high school age who may best serve themselves by enrolling for vocational and technical training while also enrolled in a local high school, public or private; f) student personnel services; g) community services; h) vocational education for persons who have academic, socio-economic, or other handicaps which prevent succeeding in regular vocational educational programs; i) training, retraining, and all necessary preparation for productive employment of all citizens.

The legislature has defined the duties of the boards of education of the area districts to be: a) prepare an annual budget; b) designate amounts to be raised by local taxation; c) receive and expend federal funds, tuition, state aid payments, state funds for sites and facilities and donations and gifts; d) acquire sites and erect and equip buildings; e) contract indebtedness and issue bonds for acquiring sites and erecting and equipping buildings; f) determine the curriculum to be offered; g) change boundaries of director districts if major population changes take place (there are five to nine director districts within each area district based on equal population representation); h) determine tuition rates; i) enter into contracts; j) establish policy consistent with law and regulations of the state board; k) have authority to sell any articles resulting from any vocational program; l) with consent of the inventor, may secure patents or copyright on inventions of students, instructors, and officials of vocational schools or community colleges.

At this juncture it appears unfortunate that the area districts are emerging in a somewhat inequitable fashion in terms of pupils and financial bases. Gross variations exist in the valuations and consequent financial bases of the districts, and gross variations exist in the numbers of pupils within the districts. Moreover, some observers argue that it is regrettable that existing county school systems were not dissolved and their functions absorbed with the administrative structure of the area districts.

Whether Iowa's pattern of emerging quasi-municipal governmental units superimposed upon existing local and county school units is typical of other states and whether this type of administrative structure has merits or disadvantages would necessarily be a key evaluation of the total project.

The national legislative goal of adequately expanding vocational education for individual fulfillment within the national society will present substantial modifications in social, economic and governmental institutions. The crux of this study is to know, understand and analyze the elements inhibiting and encouraging development of vocational education locally and at the state level. This study should lead to implementation of vocational educational programs pertinent to socio-economic needs based on regional demands as well as on national employment goals. Primarily, the rural or non-metropolitan populations are the focus of immediate attention. Therefore, four states whose populations can be categorized as such are being selected for comprehensive legislative and administrative analysis of the existing vocational educational programs.

No significant conclusions may yet be drawn because of the short duration of the project.

VII. REFERENCES

Research reports

1. Boles, Donald E., and Hanson, Ellis G. Governmental Implications of Area Vocational-Technical School and Community College Development in Iowa. Unpublished report, Project No. 431-13-48, Office of Education, U.S. Department of Health, Education, and Welfare. February, 1966. 119p.

2. Boles, Donald E., Leader-in-charge, Hadwiger, Don F. and Wiggins, Charles W., Principal Investigators. The Evolution of Vocational Educational Legislation and Related Measures. Unpublished report, Project No. 431-13-48, Office of Education, U.S. Department of Health, Education, and Welfare. October, 1966. 94p.

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BSTRACT *(250 words max.)*

The crux of this study is to know, understand and analyze the elements nhibiting and encouraging development of vocational education locally and on he state level. This concerns programs that are pertinent to socio-economic eeds based on regional demands as well as national employment goals. Primarily, t considers the rural or non-metropolitan populations as its focus of immediate ttention. Therefore, 4 states whose population can be categorized as such will e selected for comprehensive legislative and administrative analysis of the xisting vocational education programs. Constructive policy evaluation may be vident from this comparative research of regional development in this area. t present a thorough study of the Vocational Education Act of 1963 and the ongressional Hearings is underway with special attention given to statistical ata found in the hearings.

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